

Disparities in depressive symptoms among adolescent children of immigrants and native adolescents: Race, socioeconomic status, stress, and social supports

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BOSTON COLLEGE
Graduate School of Social Work

DISPARITIES IN DEPRESSIVE SYMPTOMS AMONG ADOLESCENT CHILDREN
OF IMMIGRANTS AND NATIVE ADOLESCENTS: RACE, SOCIOECONOMIC
STATUS, STRESS, AND SOCIAL SUPPORTS

A dissertation
by

JENNIFER BRAGA LEONARDO

Submitted in partial fulfillment
of the requirements for a degree of
Doctor of Philosophy

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**DISPARITIES IN DEPRESSIVE SYMPTOMS AMONG ADOLESCENT
CHILDREN OF IMMIGRANTS AND NATIVE ADOLESCENTS: RACE,
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Dissertation Chair: Dr. Thomas O'Hare

Abstract

Depression in adolescence is associated with a number of negative consequences, including low school achievement, substance abuse, increased risk of later major depression, and suicide. Adolescent children of immigrants are arguably at greater risk of depression than their native counterparts, due to greater likelihood of migration-related stress, a minority racial/ethnic background, lower socioeconomic status, and lower proficiency in the host society language. Informed by theories of assimilation and social network theory, this study examines the contribution of assimilation, sociodemographic factors, and social supports to depressive symptoms in immigrant and native United States adolescents. Nationally representative data on United States adolescents from Waves I and II of the National Longitudinal Study of Adolescent Health ($N = 4,263$) are analyzed. Results demonstrate immigrant adolescents report significantly higher levels of depressive symptoms and more risk factors for depression than their native peers. However, hierarchical regression analysis shows generational status ceases to be a significant correlate of depressive symptoms when age, sex, race/ethnicity,

socioeconomic status, and home language are controlled. Mediation analysis shows unique relationships between control variables, social supports, and depressive symptoms. Findings are in accordance with social network theory, but challenge assimilation theories premised on the assumption that immigrants face unique migration related challenges that are overcome through generations. Findings support adolescent children of immigrants and native children share common *non-migratory* related risk factors of depressive symptoms, and adolescent children of immigrants are at *greater likelihood* of experiencing these risk factors. Practice and policy implications are discussed.

Keywords: health disparities, depression, assimilation, immigrant, adolescence, social support, parental support, school support, peer support, intergenerational network closure, stress

DEDICATION

To Maria Gertrudes and Joseph Peter Braga,

Mark S., Luke, Mark B., Samuel, and Sonya Leonardo,

it is in your presence and with your support that I feel most fulfilled, challenged, and
inspired to better understand our world, human relations, and serve others.

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Chapter I. Introduction

Purpose and Significance

Twelve percent of adolescents in the United States, aged 13 to 18, have experienced a depressive disorder in their lifetime, with rates of depression nearly doubling from ages 13 to 14 (8.4%) to ages 17 to 18 (15.4%) (Merikangas et al., 2010). Depression can be an episodic and debilitating disease that causes decreases in quality of life and negatively impairs social and occupational functioning (Pratt & Brody, 2008). Severe consequences associated with depression during adolescence include greater risk for later major depression, low school achievement, substance abuse, drunk driving, and greater risk of suicide (Fergusson & Woodward, 2002; Testa & Steinberg, 2010). Identified risk factors among adolescents are increased age, being female, a black, Hispanic, and/or Asian race/ethnicity, low socioeconomic status, and stress (Adkins, Wang, Dupre, van den Oord, & Elder, 2009; Costello, Swendsen, Rose, & Dierker, 2008; Harker, 2001; Meadows, 2007; Mueller, 2009; Van Voorhees et al., 2008). Protective factors include parental support, school support, peer support, self esteem, and English language ability (Meadows, 2007; Mueller, 2009; Rumbaut, 1994; Van Voorhees et al., 2008).

Adolescent children of *immigrants* in the United States are arguably at greater risk of depression (Oppedal & Røysamb, 2004). According to the 2009 American Community Survey, 12.5% of the United States population is foreign born. Children of immigrants represent one in five children in the United States and are the fastest growing population for those under eighteen (Fortuny & Chaudry, 2009; Gryn & Larsen, 2010;

The Urban Institute, 2006). Over half live in families with incomes below 200% of the federal poverty line (Reardon-Anderson, Capps, & Fix, 2002). They are more likely to live in urban areas, be of Latino or Asian origins, use a foreign language at home, and have less educated parents than their native peers (Harker, 2001). They are also faced with adapting psychologically and socioculturally to a new cultural context (Berry, Phinney, Sam, & Vedder, 2006). This process introduces stress on the migrant, which is associated with an increased risk for anxiety, depression, and identity confusion (Berry, Kim, Minde, & Mok, 1987; Hovey & Magana, 2002; Potochnick & Perreira, 2010). However, a review of the literature also shows children of immigrants possess protective factors against depression that may temper the risk factors associated with migration. These protective factors are often studied as different types of social supports. A study by Xu, Bektashi and Tran (2010) found foreign born adolescents report lower levels of psychological wellbeing than U.S. born adolescents; however, demographics and social support, rather than foreign born status, account for this difference. Likewise, Harker (2001) found when parental supervision, closeness with parents, parent-child conflict, church attendance, and social support are controlled, differences in depression are no longer significant between adolescent children of immigrants and third-plus generation adolescents. However, these studies are not without limitations. Xu et al. (2010) do not use nationally representative data and only include two types of social support (e.g., family support and school support). Harker (2001) tests social support as one construct that encompasses support from adults, teachers, parents, friends, and family; thereby, constraining the investigation of distinct forms of support. Both studies lack a measure of intergenerational network closure, conceptualized as a distinct support realized

through relationships parents of friends have with one another that allow for norm setting, sanctions, monitoring, and guidance of child behavior (Coleman, 1988). Coleman (1988) posits intergenerational network closure is associated with positive child outcomes. This unique contribution of Coleman (1988) has not been tested with adolescent children of immigrants in relation to level of depressive symptoms.

Although research efforts have advanced our understanding of depression in adolescence and factors accounting for disparities in depressive symptoms between adolescent children of immigrants and native adolescents, there remain gaps in the literature. Aside from the Harker (2001) study, the majority of research on adolescent immigrants and depression do not include a native comparison group (Rumbaut, 1994; Ying & Han, 2008). Studies tend to use purposive samples, limiting findings in that they cannot be generalized to larger populations (Kovacev & Shute, 2004; Rumbaut, 1994; Ying & Han, 2008), or use samples that are locally, but not nationally, representative (Xu et al., 2010). Although stress has been identified as a risk factor for depression in adolescence, it has not been well investigated in relation to assimilation in the adolescent population. The types of social support investigated in the literature are mostly limited to parental, friend, and school support (Harker, 2001; Kovacev & Shute, 2004; Xu et al., 2010), leaving out the investigation of intergenerational network closure. Further, studies use measures of depressive symptoms that have not been validated by race/ethnicity and generational status in the adolescent population in the United States (Harker, 2001; Ferreira, Deeb-Sossa, Harris, & Bollen, 2005).

Specific Aims

The key aim of this study is to investigate a pathway from assimilation to depressive symptoms in adolescents. The investigation includes controlling for key background factors noted in the literature as risk factors for depression in adolescence. Stress, parental support, school support, peer support, and intergenerational network closure are investigated as mediators in the pathway. This study builds on previous theoretical (Alba & Nee, 1997; Berkman, Glass, Brissette, & Seeman, 2000; Portes & Rivas, 2011) and empirical work (Harker, 2001; Xu et al., 2010). The significance of the study is that stress is included as a key construct, social support is investigated as four separate constructs (e.g., parental support, school support, peer support, and intergenerational network closure), a validated measure of depressive symptoms for adolescent children of immigrants in the United States is used, and nationally representative data are analyzed.

Findings from this study are valuable to social work practitioners, mental health counselors, researchers, and policy makers working to eliminate health disparities and meet the mental health needs of the fast growing population of children of immigrants in the United States. For practitioners and counselors, identification of mechanisms that explain differences in depressive symptoms among immigrant and native children allows for development of tailored interventions. Researchers will gain a better understanding of how different types of support and stress are associated with depressive symptoms among adolescent children of immigrants and native peers and where future research should be directed. Policy makers will have data from a nationally representative sample

to inform policy at all levels of government, aimed at the reduction of mental health disparities among adolescents.

Chapter II. Literature Review

Theoretical Framework

Theories of assimilation, social network theory, and the Berkman et al. (2000) conceptual model of how social networks impact health provide the theoretical framework for this study. This chapter begins with a discussion of the theoretical framework, followed by the study's conceptual model (see Figure 1, p. 16). The five mediators under investigation are reviewed as risk and protective factors of depressive symptoms. Control variables are briefly discussed as additional protective and risk factors. The chapter concludes with the study's research questions.

Assimilation and Psychological Wellbeing

Assimilation theories, under development since the early 1920s, are central to understanding the American experience of immigration. They vary in focus from cultural to structural perspectives and include theories on the Hispanic challenge, new assimilation theory, second-generation advantage, generations of exclusion, segmented assimilation, and age of migration (Portes & Rivas, 2011). New assimilation theory and segmented assimilation theory are two prominent theories in the recent literature that provide the context for how assimilation is considered in this study. They allow for cultural and structural consideration and inform the selection of variables under investigation. In depth-discussion and comparison of other assimilation theories are outside the scope of this study.

Cultural perspectives view assimilation in a historical context that demonstrates consonant patterns of assimilation over generations. Alba and Nee (1997) provide a comprehensive account of this perspective and how assimilation theory has been

expanded and developed through the years. Sociologist Park's work in the early 1900s portrays assimilation as a cycle that begins with contact between groups that leads to competition for group advantage, to accommodation/acceptance of positions of power, to eventual assimilation, where interpersonal relationships lead to boundary crossing (Alba & Nee, 1997). Milton Gordon in the 1960s advanced the concept of assimilation by providing a testable framework and distinguishing concepts of acculturation from assimilation. He advocated acculturation as the first step in the assimilation process, typically characterized by acquisition of English language ability. The second step is structural assimilation, when minority groups enter into the structure of American society through clubs and core institutions. This step is necessary for complete assimilation to take place. The third step is identification assimilation, when immigrants adopt an exclusive national American identity. The general criticism of Gordon's work is its lack of attention to historic changes that interact with assimilation, such as changing residential patterns in the United States in post war eras or periods of mass migration (Alba & Nee, 1997). Following Gordon's work is the straight-line assimilation concept of the 1970s that maintains the view of assimilation as a process that unfolds over generations and is characterized by becoming "more American." It is critiqued for not considering multiple identities among immigrants. Alba and Nee (1997) draw on this evolution of assimilation theory to put forth "new assimilation theory." Assimilation is defined as "a social process that occurs spontaneously and often unintendedly in the course of interaction between majority and minority groups" (Alba & Nee, 1997, p. 827). This process is characterized by a decline in cultural and social differences that may take place in either or both groups and usually occurs over multiple generations. Assimilation

is to the broad mainstream society that is continuously changing, and “the new melting pot” does not impose the dominant culture on immigrants. This view argues there are historical patterns of assimilation and does not view racial/ethnic and economic barriers as insurmountable, as evidenced by the experience of prior immigrant groups. Alba and Nee (1997) point to the acceptance of white/Chinese intermarriage today, the economic security attained by dark skinned South Asians, and successful assimilation of immigrant groups during the Depression Era (Alba & Nee, 1997). However, Alba and Nee (1997) caution new immigrants appearing to have connections to African Americans in the United States will likely face the largest racial barriers to assimilation (p. 846). Another important aspect of new assimilation theory is that cultural and linguistic assimilation does not equate unequivocally with upward socioeconomic mobility in America (Alba & Nee, 1997; Portes & Rivas, 2011). Ultimately, Alba and Nee (1997) argue assimilation theory should not be rejected, but further developed. Research should continue to make comparisons between past and new immigrant groups, while being cautious not to draw preliminary conclusions from immigrant groups who have only been in the United States for a short period of time and not to use today’s racial and economic climate to exaggerate how different today’s context is from that faced by past immigrant groups (Alba & Nee, 1997).

The structural perspective of assimilation emphasizes socioeconomic outcomes, rather than social relations. Portes and Rivas (2011) provide an overview of different assimilation theories falling under this perspective, with focused attention on segmented assimilation theory. Segmented assimilation theory has recently evolved and is supported by empirical evidence from second generation adolescents and young adults in America.

Segmented assimilation theory considers the vulnerabilities of new immigrants to a racially stratified American class system that can lead to upward *or* downward mobility. It calls into question the justification of assimilation into a mainstream society that may not be accessible to new immigrants and does not fulfill the hopes or expectations of the new immigrants and/or their parents (Haller, Portes, & Lynch, 2011). It encourages selective acculturation where parents and co-ethnic communities work to ensure children retain protective elements of their home culture that prevent them from experiencing discrimination and falling prey to street life and gangs (Portes & Rivas, 2011). It considers parental human capital, family structure, and modes of incorporation as the defining context for socioeconomic outcomes of the assimilation process (Portes & Rivas, 2011). Evidence for this theory is largely from the Children of Immigrants Longitudinal Study.

Recent empirical research focuses on both cultural and structural theories of assimilation and has expanded beyond a primary focus on adult immigrants to include adolescents and young adults (Alba, Kasinitz, & Waters, 2011; Haller et al., 2011). New assimilation theory and segmented assimilation theory provide the context for the current study, highlighting the importance of viewing assimilation as *a process over multiple generations* (Alba & Nee, 1997) and giving *critical consideration to background variables*, such as race/ethnicity, socioeconomic status, and parental human capital in America (Portes & Rivas, 2011). The focus these theories place on cultural and socioeconomic outcomes also implicitly makes aware the less researched *psychological outcomes* of assimilation, the focus of this study.

This study aims to understand how assimilation, over generations, is related to depressive symptoms in adolescents through stress and various social supports, with attention to key background variables that may pose vulnerabilities to immigrant groups. The definition provided by Alba and Nee (1997) serves as the definition of assimilation used in this study. Drawing on the cultural perspective, it is expected that subsequent immigrant generations will exhibit better psychological outcomes than earlier immigrant generations. The first generation is expected to experience migratory stressors, such as adaptation to a new culture, acquirement of a new language, and discrimination, that are associated with decreased psychological wellbeing (Crockett et al., 2007; Gaudet, Clément, & Deuzeman, 2005). Subsequent generations are expected to have fewer stressors, and therefore better psychological wellbeing. However, empirical results, as discussed below, are inconsistent. Prior to reviewing the literature, key considerations to note include the use of inconsistent measures of assimilation and the interchangeable use of the terms assimilation and acculturation. To provide the most accurate information to readers, a sample of the measures used in each study is provided and the original researchers' terminology of "assimilation" or "acculturation" is maintained.

Studies finding a positive relationship between assimilation and increased mental wellbeing are first reviewed. Stefanek, Strohmeier, Fandrem, and Spiel (2012) found first generation Austrian adolescents reported more depressive symptoms than native Austrian adolescents. Lee and Holm (2011) found acculturative stress (e.g., language difficulty, discrimination, etc.) was positively associated with depression in elderly Korean immigrants. Lam, Pacala and Smith (1997) found acculturation to U.S. society (e.g., language use, preference for friends, neighbors and food, etc.) was associated with a

decrease in depressive symptoms in a sample of elder Chinese Americans. In contrast are studies that report an association between assimilation to American society and decreased psychological wellbeing. Nguyen, Rawana, and Flora (2011) found adolescent children of immigrants with increased language proficiency in the host society's dominant language exhibited more depressive symptoms beginning in mid-adolescence than adolescent children of immigrants with lower proficiency levels. They also found second generation adolescent children of immigrants demonstrated a steeper trajectory of depressive symptoms than first generation adolescent children of immigrants. Nguyen and Peterson (1993) found acculturation to U.S. society (e.g., lower proficiency in Vietnamese language, less Vietnamese cultural participation, less Vietnamese friends, preference to marry a non-Vietnamese, etc.) among Vietnamese-American college students was associated with an increase in depressive symptoms. Burnam, Hough, Karno, Escobar, and Telles (1987) found native born Mexican Americans who were more acculturated to U.S. society (e.g., later generational status, increased English language, lower proportion of time spent celebrating cultural traditions, less ethnic identification, etc.) exhibited more major depression than immigrant Mexican Americans. Then, there are studies that fail to show a significant relationship between assimilation and depression. Harker (2001) uses nationally representative data to show depression among adolescent children of immigrants (first and second generation) does not significantly differ from depression experienced by third generation adolescents once demographic and support variables are controlled. Perez, Dawson, and Suárez-Orozco (2011) show acculturation (e.g., host language) is not significantly associated with depressive symptoms in first generation Latino youth.

Methodological limitations likely contribute to these mixed results. Many studies lack a comparison group, representative data, and validated measures of depression. Measures of assimilation are also inconsistent across studies, making it possible that different constructs, such as cultural participation, cultural preference, discrimination, and language ability, are being measured. The current study operationalizes assimilation as first generation, second generation, and third-plus generation. This is consonant with the agreed upon view that assimilation is a process that unfolds over multiple generations. Based on mixed results in the literature, the question of how assimilation is related to depressive symptoms is left open.

Social Networks and Psychological Wellbeing

Research over the past 60 years has led to wide recognition that social relationships impact both physical and mental health. The conception of social networks has been developing since the 1950s when sociologist Barnes' research demonstrated social ties beyond kinship are associated with increased life opportunities. The 1970s brought the suggestion that social networks can impact mortality. The 1980s brought increased emphasis to defining individuals' social networks as the number of family and friends and memberships in institutions and voluntary groups. The 1990s expanded this research to investigate the provision of supports available through networks, spurring the development of social network and social support theories (Berkman et al., 2000).

Social network theory posits the extent to which one can influence his or her success goes beyond individual attributes to relationships he or she has in his or her network. Social networks facilitate the flow of resources, allow for strategic influence from social ties, offer social credentials, and reinforce identity and recognition (Lin,

1999, p. 31). A recognized contribution of social network theory is its testability of network structure, and the resources made available through that structure, on individual behaviors and attitudes. It also dispels notions of community as only related to geography or kinship (Berkman et al., 2000). Network analysis primarily studies the structure and composition of the social network and the resources available through the network. Network structure and composition include the size, reachability and homogeneity of the network as well as the network ties, such as frequency and type of contact between members of the network. Network resources are commonly conceptualized as social supports, including instrumental support, informational support, emotional support, and appraisal support (Berkman et al., 2000). Instrumental support includes time, money, and physical assistance. Informational support is advice and suggestions. Emotional support is caring, love, empathy, and trust and appraisal support is constructive feedback, affirmation, and social comparison. Research on the relationship between social networks and health remains relevant today, can be improved, and can be extended to less researched populations.

Under researched are the mechanisms by which social-structural conditions shape social networks, and ultimately health. Berkman et al. (2000) developed a comprehensive conceptual model of how social networks impact health based on social network theories and theoretical orientations developed by Emile Durkheim and John Bowlby. Durkheim's seminal work established the relationship between society and health, highlighting how social patterns such as social integration, norms, and controls relate to individual psychological health. He cautioned that social turbulence and change often bring forth societal crises of economic and/or political nature that can weaken

societal norms and controls. His work remains relevant as an important reminder to consider societal variables in studying and understanding psychological health (Berkman et al., 2000). Psychoanalyst Bowlby's contribution of attachment theory elucidates the universal need for secure attachments that begin in early childhood and span the life course. These attachments provide a sense of stability and promote self esteem that allow for secure relationships. Social network theory and empirical studies relate networks and supports with life outcomes, including health. Berkman et al. (2000) drew on these works to develop a comprehensive, theoretically based model of how social networks impact health (see Figure A1, p. 92). The model highlights mechanisms for how social-structural conditions shape social networks, that then provide opportunities for resources that impact health. Social-structural conditions include the culture of a society, socioeconomic factors, politics, and social change. These conditions are expected to shape the structure and characteristics of one's social network, such as the size of the network, who is in the network, and the frequency and intensity of contact between members. The social network then provides opportunity for psychosocial mechanisms such as social supports, social influence, social engagement, person-to-person contact, and access to resources and material goods. The model concludes with psychosocial mechanisms impacting health through a number of pathways, including behavioral pathways (e.g., smoking, alcohol consumption, diet, etc.) and psychological pathways (e.g., self-esteem and depression). Berkman et al. (2000) advocate the importance of understanding social networks in this larger context in order to prevent the exclusive study of more proximal social network variables, that may detract from understanding societal underpinnings of health, and also to understand unexpected findings that larger

or more supportive networks are sometimes associated with negative health outcomes.

The model depicts complex and multiple relationships to consider (Berkman et al., 2000, p. 847).

Conceptual Model

Through mediation analysis, this study aims to understand mechanisms through which assimilation and background variables, stress and social supports, and depressive symptoms are related (see Figure 1, p. 16). When comparing the conceptual model for this study with the Berkman et al. (2000) model there are significant differences, largely based on the research questions under investigation and available data. Although social-structural variables in the Berkman et al. (2000) model were not available for investigation, they guided the selection of key background variables in this study's conceptual model. In an increasingly diverse American society, that has strong historical roots of immigration, racism, sexism, and income inequality, the relevance of understanding social-structural conditions is vital to understanding and addressing persistent health disparities. Berkman et al. (2000) describe the culture of a society as including its norms and values, social cohesion, racism, and sexism. The current study includes race/ethnicity, sex, and socioeconomic status as important background variables to control. Other background variables are age and English as the home language. The second part of this study's conceptual model focuses on stress and social supports that are expected to mediate the relationship between assimilation and background variables and depressive symptoms. In considering the ecological context in which the child is raised, relationships with parents, school, and the peer group are important to consider when investigating determinants of child psychological wellbeing (Bronfenbrenner, 1979).

Stress is conceptualized as school related stress. Three of the four social support mediators are emotional supports (e.g., parental support, school support, and peer support). Intergenerational network closure is operationalized, strictly speaking, as a measure of network structure; however, for the purpose of this study it is conceptualized as a proxy for an additional emotional support. The final part of the conceptual model includes two mental health outcomes, depressive symptoms and self esteem. This study focuses specifically on plausible mechanisms of depressive symptoms, while recognizing self esteem is an important variable to control (Mueller, 2009; Rumbaut, 1994; Ying & Han, 2008). All variables are further discussed below.

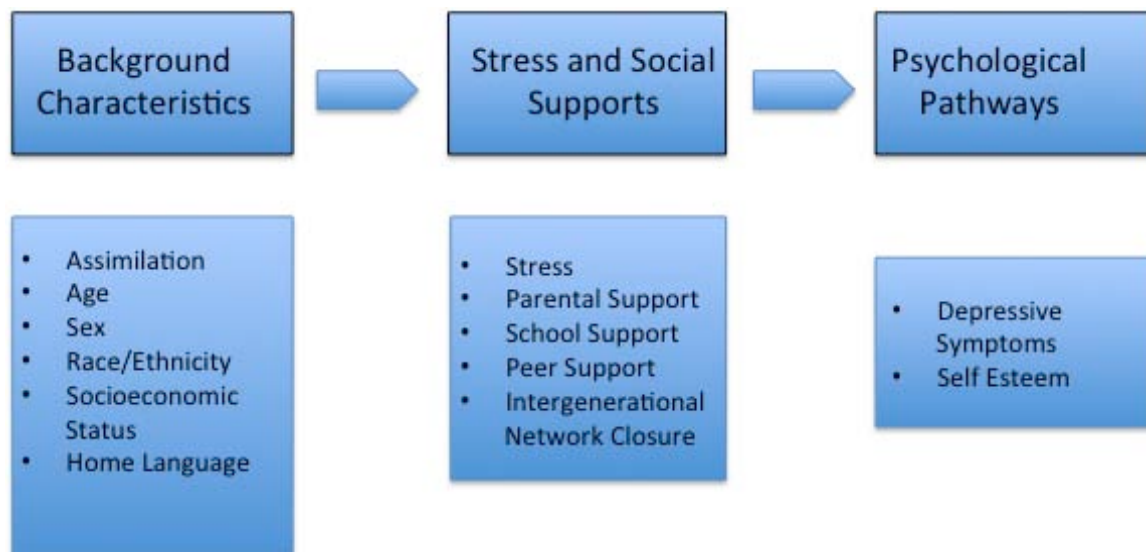


Figure 1: Conceptual model of how assimilation and background factors are related to depressive symptoms through stress and social supports

Stress as a Risk Factor

Stress and Depression

Studies show a positive relationship between stress and depressive symptoms in both adolescent and immigrant populations (Adkins et al., 2009; Schraedley, Gotlib, & Hayward, 1999; Shen & Takeuchi, 2001). Schraedley et al. (1999) used cross sectional nationally representative data from the Commonwealth Fund Adolescent Health Survey to demonstrate a significant association between life stress and depressive symptoms ($p < .001$). Adkins et al. (2009) conducted longitudinal data analysis on a nationally representative sample of United States adolescents ($N = 18,764$) to show stressful life events are significantly and positively related to depressive symptoms at all ages. Brown et al. (2007) conducted longitudinal data analysis with nationally representative data from the National Longitudinal Study of Adolescent Health ($N = 20,126$) to demonstrate minority adolescents report significantly more stress events than whites ($p < .05$). These studies are valuable in that they use strong methods to demonstrate not only a positive association between stress and depressive symptoms in adolescence, but also associations with minority status. However, there is still a dearth of literature that investigates stress and depressive symptoms by generational status within the adolescent population. Further, stress is often a composite measure that includes a combination of stressful events, ranging from divorce, rape, sexually transmitted diseases, violence, and suicide attempts to academic problems and family, romantic, and peer conflict (Adkins et al., 2009; Meadows, 2007; Meadows, Brown, & Elder, 2006).

Key studies that contribute to the conceptualization of stress in the current study are Stefanek et al. (2012) and Shen and Takeuchi (2001). Stefanek et al. (2012) separated

critical life events (e.g., death of a close person, serious physical or mental illness, substantial financial problems, etc.) from daily stress (e.g., arguing with parents, difficulty with peers, difficulty with subject matter in school, feeling different from others, etc.). Daily stress was significantly related to depressive symptoms for a purposive sample of first generation, second generation, and native adolescents in Austria and fully mediated the relationship between critical life events and depressive symptoms. Interestingly, first and second generation Austrian adolescents reported different types of daily stress as compared with native Austrian adolescents. First generation adolescents reported more stress related to parents, the self, leisure, romantic partner, and their future. Second generation adolescents reported more stress related to parents, school, and romantic partner. Stefanek et al. (2012) explain these findings with respect to the migration experience, suggesting first generation adolescents may experience greater feelings of alienation, be less knowledgeable of, and have less time for, leisure activities, and have less knowledge of the education system and job opportunities. They suggest second generation adolescents report more school related stress due to waning immigrant optimism of the education experience and societal mobility (Stefanek et al., 2012). Strengths of this study include the identification of different types of stress reported by immigrant adolescents and natives and the use of structural equation modeling to demonstrate a significant association between stress and depressive symptoms in adolescents. However, caution must be taken in interpreting and applying these findings, as they are based on a purposive sample ($N = 682$), cross sectional data, and do not control for key background variables (e.g., racial/ethnic minority status, sex, and socioeconomic status). Shen and Takeuchi (2001) also investigated daily stress in

relation to both assimilation and depressive symptoms. They found assimilation was indirectly related to depressive symptoms. Higher levels of assimilation were associated with higher stress (standardized coefficient = .28, $p < .05$), which in turn was associated with increased depressive symptoms (standardized coefficient = .65, $p < .05$). Strengths of this study are the use of a representative community sample, structural equation modeling, and a reliable measure of acculturation that considered language use, patterns of social contact, participation in cultural activities, generational status, and proportion of time living in the United States (Cronbach $\alpha = .88$). Limitations include the use of cross sectional data, a majority adult first-generation Chinese American sample (94.5%), considering interpersonal stress and job related stress as one construct, and low reliability for the interpersonal stress subscale (Cronbach $\alpha = .66$). The current study builds on Stefanek et al. (2012) and Shen and Takeuchi (2001) in that it operationalizes assimilation as generational status, uses a nationally representative sample of adolescents to investigate the relationship between assimilation and depressive symptoms, and conceptualizes stress as a daily shared experience in the school environment. Empirical evidence from the aforementioned studies shows a positive association between stress and depressive symptoms. However, the evidence base is not substantial enough to form a prediction of the relationship between assimilation and daily school-related stress (Shen & Takeuchi, 2001; Stefanek et al., 2012).

Social Supports as Protective Factors

Social Support and Depression

Parental support.

It is long recognized that the family context, and especially parent-child relations, are associated with and influence a number of child outcomes, including mental health. A substantial body of empirical evidence shows parental support is a protective factor against depressive symptoms in both adolescent children of immigrants and native adolescents (Harker, 2001; Meadows, 2007; Nguyen et al., 2011; Rumbaut, 1994; Sabatier & Berry, 2008; Ying & Han, 2008). This support is commonly conceptualized as close relations and/or low conflict in the parent-child relationship and is often reported by the child. Likert scales are generally used to measure these constructs and demonstrate strong reliability (Cronbach $\alpha > .75$) (Harker, 2001; Nguyen et al., 2011; Sabatier & Berry, 2008; Xu et al., 2010; Ying & Han, 2008). However, some studies use scales with lower reliability (Cronbach $\alpha = .56$ to $.66$) (Nguyen et al., 2011; Rumbaut, 1994). The relationships between close family relations and depressive symptoms and family conflict and depressive symptoms are generally significant and moderate, as evidenced by regression coefficients ranging from $.25$ to $.33$ ($p < .05$) (Rumbaut, 1994; Sabatier & Berry, 2008; Xu et al., 2010; Ying & Han, 2008). However, a study by Harker (2001), that used nationally representative data for United States adolescents, suggests a weaker relationship ($b = -.05$, $p < .001$).

The importance of maintaining high levels of parental support is pronounced for immigrant adolescents. As parents and children acculturate at different levels, values and understanding around attitudes and behaviors can come into conflict, resulting in lower

levels of support and associated higher levels of depression (Rumbaut, 1994; Rumbaut & Portes, 2001; Xu et al., 2010; Ying & Han, 2008). One study, using state level representative data, found foreign born adolescents report significantly less support from their parents ($M = 24.77$, $SD = 3.47$) than U.S. born adolescents ($M = 25.96$, $SD = 2.87$) ($p < .01$) and foreign born status is significantly correlated with less parental support ($p < .05$) (Xu et al., 2010). Another study, using nationally representative data, found a similar finding; with first and second generation adolescents reporting a lower mean score of parental closeness ($M = 4.16$ and $M = 4.23$ respectively) than third-plus generation adolescents ($M = 4.27$). However, whether this difference is significant was not reported (Harker, 2001). Aside from immigrant status, there is also empirical evidence that racial/ethnic minority status, lower socioeconomic status, and foreign language use at home, background variables for which immigrant adolescents are at greater risk, are associated with lower levels of parental support ($p < .05$) (Xu et al., 2010).

To my knowledge, studies have not used nationally representative data, a native comparison group, and a validated measure of depressive symptoms for United States adolescents by race/ethnicity and assimilation to investigate the role of parental support as a mediator in the relationship between assimilation and depressive symptoms. Most studies use purposive samples, cross sectional data, and either regression analysis or path analysis to investigate the relationship between parental support and depressive symptoms in immigrant adolescents (Rumbaut, 1994; Sabatier & Berry, 2008; Ying & Han, 2008). However, there are studies that use representative (Harker, 2001; Nguyen et al., 2011; Xu et al., 2010) and longitudinal data (Nguyen et al., 2011) to explore this

relationship in samples containing both immigrant and native adolescents. Findings are consistent across studies, that parental support is a significant correlate of depressive symptoms. Based on the preponderance of evidence, I expect parental support will increase with assimilation and will mediate the relationship between assimilation and depressive symptoms, with more parental support associated with less depressive symptoms (Harker, 2001; Nguyen et al., 2011; Rumbaut, 1994; Sabatier & Berry, 2008; Xu et al., 2010; Ying & Han, 2008).

School support.

From an ecological perspective, the school is an influential environment for a number of child outcomes (Bronfenbrenner, 1979). With education federally legislated in the United States, school is a common and constant environment in which the majority of children, immigrants and non-immigrants, find themselves. The school environment should be supportive in that children feel safe, secure, and a sense of belonging while at school. Research using nationally representative data shows increased school support, often measured as school belonging/school connection or teacher support, is associated with decreased depressive symptoms in United States adolescents (Costello et al., 2008; Meadows, 2007; Mueller, 2009).

Under researched is the association of school support and depressive symptoms among *immigrant* adolescents in the United States and how this compares to the native youth population. Walsh, Harel-Fisch, and Fogel-Grinvald (2010) and Xu et al. (2010) provide empirical evidence of similarities and differences between immigrant and native populations and raise important methodological considerations. When school support is measured as teacher support and acceptance from other students (akin to school

connection), foreign born adolescents report significantly lower levels of school support than native born adolescents (Walsh et al., 2010; Xu et al., 2010). Walsh et al. (2010), using cross national data from Israel, found foreign born adolescents reported significantly less teacher support ($M = 14.28$, $SD = 3.86$), on a scale from 4 to 20, than Israeli born adolescents ($M = 14.70$, $SD = 3.61$) ($t(3, 957) = 2.5$, $p < .05$). Foreign born adolescents also reported significantly more social rejection ($M = 1.05$, $SD = .98$), on a scale from 0 to 3, than native born adolescents ($M = .90$, $SD = .90$) ($t(4, 023) = 3.6$, $p < .001$). Xu et al. (2010), using state level representative data from the United States, found foreign born adolescents reported significantly less teacher/adult support ($M = 18.43$, $SD = 3.89$), on a scale from 6 to 24, than United States born adolescents ($M = 19.58$, $SD = 3.62$) ($t = 5.96$; $p < .01$). They also found foreign born status was a significant correlate of teacher support ($\beta_{\text{standardized}} = -.42$, $p < .05$). These findings are not surprising in light of challenges facing immigrant children to fit into new environments that may be unfamiliar and culturally different from their host culture. However, investigation of the relationship between school support and psychological wellbeing among immigrant and native youth yields mixed results (Walsh et al., 2010; Xu et al., 2010). Walsh et al. (2010) found the expected direct positive relationship between teacher support and wellbeing in both foreign born and native born youth (path coefficient = .11) and the significant and negative relationship between social rejection and wellbeing in both foreign born (path coefficient = -.26) and native born (path coefficient = -.24) youth. Surprisingly, Xu et al. (2010) found contradictory results for the relationship between teacher support and psychological wellbeing among foreign born and native born United States youth. The expected relationship between increased teacher support and increased

wellbeing was found for U.S. born adolescents ($\beta_{\text{standardized}} = .08, p < .01$). However, although not significant, increased school support was associated with *decreased* levels of wellbeing in foreign born adolescents ($\beta_{\text{standardized}} = -.04, p > .05$). Xu et al. (2010) suggest increased school support, in the form of teachers' and administrators' expectations, may have a negative effect on the foreign born adolescents, due to an association between increased support and heightened school related anxieties. This finding is valuable for researchers in light of how school support and immigrant adolescents are operationalized. In the Xu et al. (2010) study, it appears teacher/adult support may be distinct from and operate differently from school support measured as feeling safe, secure, happy, and close to people or other students in school (school belonging or school connection) (Mueller, 2009; Walsh et al., 2010). The Xu et al. (2010) study also considers the immigrant adolescents as strictly foreign born and places second generation immigrants with third-plus generation adolescents.

The current study aims to add evidence to the small body of literature that compares levels of school support between immigrant and native adolescents and investigates the relationship between school support and depressive symptoms. School support is investigated as a sense of belonging and connection, rather than teacher support. Generational status distinguishes the first generation (or foreign born), second generation, and third-plus generation. Based on the small number of empirical studies and methodological weaknesses of these studies (e.g., lack of nationally representative data, inconsistent measures, and cross sectional data analysis), a prediction is not made regarding school support as a mediator in the pathway from assimilation to depressive symptoms.

Peer support.

Adolescence is a time of identity development and increased independence, when teenagers increasingly turn to their peer group for identification, support, and information. Empirical studies show an increase in peer support is associated with a decrease in depressive symptoms in adolescent populations (Costello et al., 2008; Nguyen et al., 2011; Van Voorhees et al., 2008). Under researched is how peer support is associated with depressive symptoms in adolescent children of immigrants and how this compares with native adolescents. Adolescent children of immigrants, finding themselves in cultures different from their own, may be challenged to understand the new culture quickly, and in a way that allows them to develop positive peer relations. They may also be from collectivist cultures that do not stress the importance of peer relations as a means of gaining independence that is found in more individualistic cultures (Oppedal and Røysamb, 2004). In addition, they may lack full proficiency in the English language and be at greater risk of experiencing discrimination in the new culture (Gaudet, Clément, & Deuzeman, 2005; Rumbaut, 1994).

Empirical studies show immigrant adolescents report less peer support than native adolescents; however, the significance of peer support in relation to mental wellbeing in immigrant populations is unclear. Oppedal and Røysamb (2004) investigated peer support and symptoms of depression and anxiety in a sample of immigrant and native youth in Oslo, Norway ($N = 633$). They found immigrant adolescents reported significantly less peer support ($M = 1.42$, $SD = 0.39$) than native adolescents ($M = 1.35$, $SD = 0.38$), where less support is represented by a higher score. The expected association of less peer support with less mental wellbeing was found ($r = .26$, $p < .001$) in the full

sample of immigrants and natives. Regression analysis yielded peer support as a significant correlate of mental wellbeing for both female ($\beta_{\text{standardized}} = .15, p < .05$) and male ($\beta_{\text{standardized}} = .16, p < .01$) host adolescents. Interestingly, peer support was *not* a significant correlate of mental wellbeing for either female or male immigrant adolescents. These findings suggest peer support may operate differently for immigrant and host adolescents. Oppedal and Røysamb (2004) suggest the strong importance of peer support among host adolescents could reflect the more individualistic culture in Norway. Limitations of this study are that it uses a purposive sample, cross sectional data, and does not report the specific survey items used to measure peer support. This result is also in contrast to findings reported by Nguyen et al. (2011), who used multilevel modeling and longitudinal data analysis to show higher levels of peer relationships are associated with lower initial levels of depressive symptoms ($p < .01$) in a nationally representative sample of Canadian adolescent immigrants ($N = 1,060$). Whether Canada is considered a collectivist or individualistic society is largely determined by which country comparisons are conducted, but overall Canada is considered an individualistic society, although to a less extent than the United States. Aside from the methodological strengths of the Nguyen et al. (2011) study, an important limitation is the lack of a native comparison group that would allow for comparisons of level of peer support and strength of relationships between peer support and wellbeing between immigrant and native adolescents.

Based on a developmental perspective, social network theory, and empirical evidence demonstrating the protective role of peer support against decreased psychological wellbeing in the general adolescent population, the current study

investigates peer support as a mediator in the pathway from assimilation to depressive symptoms.

Intergenerational network closure.

Intergenerational network closure is an under-researched form of social support that considers the overlap of relationships between friends and friends' parents as a unique type of support for children. Coleman (1988) conceptualizes network closure as the relationships parents of friends have with one another that allow for increased monitoring and norm setting for children. Through parent-to-parent relationships, opportunities to share information and enforce common expectations increase.

To my knowledge, intergenerational network closure has not been tested in relation to depressive symptoms in adolescence, but it has been tested in relation to educational outcomes. It has also been recently investigated, and presented in a dissertation by Fettes (2009), in relation to mental health service utilization. A related construct, parental monitoring, has been investigated in relation to depressive symptoms and child immigrant status. These works, discussed below, provide the basis for including intergenerational network closure in the current study. Carbonaro (1998) analyzed data from the National Education Longitudinal Study of 1988 ($N = 16,489$) and found intergenerational network closure was associated with less likelihood of dropping out of high school, when sociodemographic and socioeconomic characteristics were controlled (odds ratio = .74; $p < .01$). Among study strengths are the use of nationally representative data and additional regression analyses to rule out potential spurious relationships between intergenerational network closure and depressive symptoms. However, notable limitations are the use of cross sectional data and the measure of

intergenerational network closure as the number of parents of close friends that are known. Carbonaro (1998) emphasizes the need for qualitative data to understand what it is about network closure that is associated with dropping out of high school, including data on the information about child behaviors that parents receive through closure and the types of norms and pressures that closure may be associated with. Fettes (2009) used nationally representative data from the National Longitudinal Study of Adolescent Health to investigate the relationship between intergenerational network closure and adolescent mental health service *utilization* and found a significant negative relationship, suggesting youth may use informal supports provided through closure instead of formal services. However, whether this type of support has a beneficial association with positive mental health *outcomes* has not been investigated. Walsh et al. (2010) investigated parental monitoring, a related construct to intergenerational network closure, in relation to depressive symptoms among Israel born youth and foreign born youth using data from the 2006 World Health Organization Health Behavior in School-Aged Children Survey. Parental monitoring was measured using a 10 item scale, ranging from 0 to 30, that asked how much parents knew about their children's activities across different life domains (Cronbach $\alpha = .89$). The Israeli-born respondents reported significantly higher levels of parental monitoring ($M = 24.95$, $SD = 4.85$) than immigrant adolescents ($M = 21.84$, $SD = 6.75$) ($t(659) = 10.5$, $p < .001$). For Israeli born youth, parental monitoring had a direct, positive association with mental wellbeing (standardized path coefficient = .10). For foreign born youth, parental monitoring acted indirectly through excess time spent with friends. Parental monitoring was negatively associated with excess time with friends (standardized path coefficient = -.08), which was indirectly associated with

mental wellbeing (standardized path coefficient = .11). This suggests foreign born youth may have negative peer influences acting on their mental wellbeing, that can be tempered by increased parental monitoring (Walsh et al., 2010). This study's strengths lie in using national data and structural equation modeling, but it is limited by cross sectional data analysis and lacks a measure for norm setting and monitoring by *other* parents.

Given the consistent, albeit scarce, evidence suggesting intergenerational network closure is a significant support for both native and immigrant adolescents, it is included in the current study. It is investigated both as a support that may vary among native born and immigrant adolescents and a mediator of depressive symptoms.

Additional Protective and Risk Factors of Depression

Control variables included in this study are age, sex, race/ethnicity, socioeconomic status, language spoken at home, and self esteem. There is general consensus that the risk of depression increases in adolescence with increased age (Harker, 2001; Mueller, 2009; Needham, 2008), being female (Adkins et al., 2009; Meadows, 2007; Meadows et al., 2006; Mueller, 2009;), having a non-white race/ethnicity (Adkins et al., 2009; Anderson & Mayes, 2010; Costello et al., 2008), and lower socioeconomic status (Costello et al., 2008; Harker, 2001; Jackson & Goodman, 2011). Studies find children of immigrants are at higher risk of living in poverty, having parents with less human capital, and being in a racial/ethnic minority (Harker, 2001; Reardon-Anderson et al., 2002). However, some studies find contradictory findings. Nguyen et al. (2011), using nationally representative data, found sex was not predictive of depressive symptoms in adolescent children of immigrants in Canada and Rumbaut (1994) found ethnicity did not have a significant association with depression in second generation

adolescents in the United States. Important to consider with these findings is that Nguyen et al. (2011) studied Canadian adolescents and Rumbaut (1994) used a purposive, albeit large, sample. This study investigates how these background factors influence the relationship between assimilation and depressive symptoms. Based on the majority of evidence, it is expected that the relationship between assimilation and depressive symptoms will be reduced when these variables are controlled.

Language spoken at home is included as a control variable, because English language use is a common measure of assimilation/acclulturation in the literature (Harker, 2001; Lam, Pacala, & Smith, 1997; Rumbaut, 1994; Ying & Han, 2008). Some studies find a positive association between English language use and increased psychological wellbeing, either directly for the adolescents (Rumbaut, 1994) or through indirect pathways of English proficiency for parents that leads to increased parental involvement and increased child psychological wellbeing (Ying & Han, 2008). However, Harker (2001) found in a representative sample of United States youth that those who used Spanish at home reported less depressive symptoms than youth who used English at home. Xu et al. (2010) did not find a significant correlation for language used at home and psychological wellbeing in a state representative sample of United States immigrant youth. For the purpose of this study, a prediction is not made regarding the impact on the relationship between assimilation and depressive symptoms when English as the home language is controlled.

Self esteem is included as a control variable based on consistent evidence of a moderately strong negative association between self esteem and depression in the adolescent population (Mueller, 2009; Ying & Han, 2008). The Berkman et al. (2000)

model of how social networks impact health treats self esteem and depression as distinct psychological pathways that impact overall health. The directionality of the relationship between self esteem and depression is beyond the scope of this study, as are the relationships between investigated mediators and self esteem. These are noted as areas for future research in the Discussion chapter. Self esteem is conceptualized as an outcome variable in the conceptual model of this study, that is important to control for when investigating plausible mechanisms leading to depressive symptoms.

Research Questions

This study is guided by two primary research questions: *How does assimilation affect depressive symptoms in adolescents after adjusting for the effect of age, sex, race/ethnicity, socioeconomic status, language spoken at home, and self esteem? How do stress and social supports mediate the relationships between assimilation, age, sex, race/ethnicity, socioeconomic status, language spoken at home and depressive symptoms, when controlling for self esteem?*

The first research question investigates the relationship between generational status (first generation, second generation, and third-plus generation) and depressive symptoms when background variables identified in the literature as important to consider when researching immigrant populations and depression in adolescence are controlled. The second research question investigates stress, parental support, school support, peer support, and intergenerational network closure as mediators in the relationship between assimilation and background variables and depressive symptoms.

Chapter III. Methods

This study uses nationally representative data from the National Longitudinal Study of Adolescent Health (Add Health) public dataset, available through the Interuniversity Consortium for Political and Social Research. This chapter begins by introducing the study design, sampling strategy, and data collection procedures. The measures, data transformations, and treatment of missing values are then discussed. Following is a presentation of the statistical analysis plan, which includes an overview of hierarchical regression analysis, mediation analysis, and multiple imputation. The chapter concludes with a presentation of the relationships between the statistical models and research questions.

Study Design

The purpose of the study design is to identify plausible pathways for how assimilation and background variables impact depressive symptoms through stress, parental support, school support, peer support, and intergenerational network closure. A cross sectional design is used to analyze data from Wave I and Wave II of the National Longitudinal Study of Adolescent Health. Independent and control variables are from Wave I data and the dependent variable is from Wave II data. This strategy is proposed as a way to control for temporal order between the key predictor, assimilation, mediators, and the dependent variable, depressive symptoms (Baron & Kenny, 1986; Harker, 2001). The selection of this approach over a lagged dependent variable approach or change score approach is discussed in the statistical analysis section of this chapter. Longitudinal analysis was not possible as all constructs under investigation were not available in multiple waves. Intergenerational network closure, parental education, and household

income are only available in Wave I of Add Health, as the parent interview was only conducted in Wave I.

Sample Strategy

Add Health was developed in response to a United States Congressional mandate for a study focused on understanding factors influencing adolescent health and risk behaviors. The Add Health sampling strategy employs a multi-staged, stratified, school based, cluster design. Eighty high schools representative of United States schools with respect to region of country, urbanicity, enrollment size, type, and race/ethnicity were selected for the original Add Health sample using a sample frame of 26,666 high schools from a Quality Education Data, Inc. database. Over 70% of the originally selected schools participated in the study. Strata were used to replace schools declining participation. All participating high schools were asked to identify junior high schools or middle schools that served as feeder schools. This resulted in a total sample of 144 middle, junior high, and high schools (“Add Health,” 2012).

Approximately 90,118 students in grades seven through twelve participated in the in-school, self-administered questionnaire between 1994 and 1995. These students and those on school rosters were then stratified by race and sex and approximately 17 students were randomly selected from each stratum, across all schools, to participate in an in-home interview. This resulted in a core sample of 12,105 adolescents. In addition, over sampling of selected ethnic groups and special samples (e.g., disabled adolescents and genetic samples of twins, siblings, and unrelated pairs in the same household) took place. This resulted in a design sample of approximately 20,745 adolescents in Wave I. Approximately 17,679 parents were also interviewed in Wave I. The Wave II follow up

was conducted one year later with approximately 14,738 adolescents. Eligibility requirements for Wave II were previous participation in Wave I and being a current student in grades 7 through 12. The majority of 12th grade students from Wave I were not part of Wave II as they did not meet the grade eligibility requirement of being in grades 7 through 12. An exception is 12th graders who were part of a genetic pair who were retained in the Wave II sample. The disabled sample was not interviewed in Wave II (“Add Health,” 2012).

This study uses the public use Add Health dataset. Participants were selected at random and comprise half of the core sample and half of the oversample of African American adolescents with a parent who has a college degree. Wave I includes 6,504 adolescents. Wave II includes 4,834 adolescents. Given this study’s design of using independent variables from Wave I and the dependent variable from Wave II, the final design sample includes the 4,834 participants from Wave II. Eligibility for the analytic sample is the ability to be classified as either first, second, or third-plus generation in the United States. This is discussed in detail in the Measures section under the measure of assimilation. The final analytic sample includes 4,263 participants ($n = 213$ for first generation adolescents; $n = 510$ for second generation adolescents; and $n = 3,540$ for third-plus generation adolescents).

Data Collection Procedures

Wave I data collection took place in 1994-95 and consists of school administrator questionnaires, 45-60 minute in-school, self administered questionnaires with adolescents, one to two hour in-home computer based interviews with adolescents, and parent questionnaires. This study uses the in-school questionnaire to provide data on the

adolescents' generational status. Independent variables are drawn from the in-home adolescent interviews and parent questionnaires. The dependent variable is drawn from the in-home Wave II adolescent interviews.

Wave I in-home adolescent interviews span a number of health topics, including health utilization, peer networks, family composition and dynamics, sexual partnerships, and substance use. Sensitive questions were asked via an audio-computer assisted self interview, whereas other questions were asked using a computer assisted personal interview. Wave I parent interviews provide self reported family data and data on adolescents' health history. Wave II data collection took place in 1996. Wave II in-home adolescent interviews were similar in nature and content to Wave I interviews, with the use of computer assisted personal interviews and audio-computer assisted self interviews.

Informed Consent

Only students who had parental consent were allowed to participate in Add Health. For the in school questionnaire, passive consent forms were used for the majority of students. Parental consent was assumed, unless a form with a signature indicating otherwise was returned to the school. For participation in the in home interviews, written informed consent was obtained from both the adolescent and the parent or legal guardian.

Measures

Depressive symptoms (dependent variable)

Depressive symptoms is represented by five items from the Center for Epidemiological Studies-Depression Scale (Radloff, 1977). These five items are from the Wave II in-home interviews. The five items ask how respondents felt in the past seven days: "You felt that you could not shake off the blues, even with help from your

family and friends,” “You felt depressed,” “You were happy,” “You felt sad,” and “You felt life was not worth living.” Responses are on a four point Likert scale (0=never/rarely/1=sometimes/2=a lot of the time/3=most/all of the time). To create a scale of depressive symptoms, “You were happy” is first reverse coded. The five items are then summed to represent a total depressive symptoms score, ranging from a low of 0 to a high of 15. Each of the five items has a negligible number of missing values, fewer than 1%. Listwise deletion is used in analyses using these variables (see Table A2, p. 94). This measure of depressive symptoms is treated as a continuous variable, although strictly speaking it is an ordinal level variable. Reliability analysis for the analytic sample yields Cronbach $\alpha = 0.79$.

Important to note, the use of a scale that has measurement equivalence across groups allows researchers to appropriately compare means on the scale and use statistical procedures such as regression analysis. This five-item scale was validated for use in different racial/ethnic groups and immigrant generations (first, second, and third-plus generations) in a representative sample of United States adolescents ($\alpha=0.78$) (Perreira et al., 2005). All items are effect indicators, an assumption of scale evaluation, presumed to be determined by the latent variable, depressive symptoms (Perreira et al., 2005). In contrast, the 19-item CES-D scale contains causal indicators (e.g., feeling lonely, feeling disliked, feeling fearful, etc.) and outcomes of depressive symptoms (e.g., poor appetite, difficulty starting things, etc.). Perreira et al. (2005) found the commonly used 19-item CES-D scale does not have measurement equivalence across racial/ethnic and generational groups of adolescents in the United States, which can result in incorrect conclusions on mental health disparities for this population.

Assimilation (key independent variable)

Assimilation is measured as immigrant generation (1 = first generation / 2 = second generation / 3 = third-plus generation) and draws on variables from the in-school and in-home Wave I interviews. The first generation is adolescents who are both foreign born and not born U.S. citizens. The second generation is adolescents who are U.S. born and have at least one foreign born parent or are foreign born, were born U.S. citizens, and have at least one foreign born parent. This distinction is made, because United States citizenship is passed through both blood rights and place of birth. The third-plus generation is U.S. born (or native born) adolescents who have two U.S. born parents or foreign born adolescents with two U.S. born parents. Parents are identified by adolescents as their biological parents. Following the strategy used by Harker (2001), no distinction is made past the third generation, this group is considered the most assimilated, and is used as the comparison group.

Stress (mediator)

A scale of school stress is created from four ordinal level variables: “How often did you have trouble getting along with your teachers?” “How often did you have trouble paying attention in school?” “How often did you have trouble getting your homework done?” and “How often did you have trouble getting along with other students?” Response categories are on a five point Likert scale (0 = never / 1 = just a few times / 2 = about once a week / 3 = almost every day / 4 = every day). The four items are summed to represent a total stress score, ranging from a low of 0 to a high of 16. Selection of scale items were guided by the literature. “Getting along with teachers” and “getting along with students” were used in a composite scale of stress by Meadows (2007). Shen and

Takeuchi (2001) used a scale of job stress that asked about stressful situations in the workplace. Job stress was extrapolated to the school environment, where “trouble paying attention in school” and “trouble getting your homework done” were selected as stressful situations. Each of the four items has a negligible number of missing values, fewer than 2%. Listwise deletion is used in analyses using these variables. Reliability analysis for the analytic sample yielded Cronbach $\alpha = 0.69$.

Parental support (mediator)

The parental support scale includes eight items: “How close do you feel to your mother?” “How close do you feel to your father?” “Most of the time, your mother is warm and loving toward you.” “You are satisfied with the way your mother and you communicate with each other.” “Overall, you are satisfied with your relationship with your mother.” “Most of the time, your father is warm and loving toward you.” “You are satisfied with the way your father and you communicate with each other.” “Overall, you are satisfied with your relationship with your father.” Responses to the first two items are on a 5-point Likert scale (1 = not at all / 2 = very little / 3 = somewhat / 4 = quite a bit / 5 = very much). Responses to the latter four items are on a 5-point Likert scale (1 = strongly agree / 2 = agree / 3 = neither agree nor disagree / 4 = disagree / 5 = strongly disagree) and are reverse coded to create a positive parental support scale. The eight items are summed to represent a total parental support score, ranging from a low of 8 to a high of 40. Parents are identified by the adolescents as the persons in their household who represents a mother figure and/or father figure. Harker (2001) used this scale with adolescents from Add Health Wave I data ($\alpha=0.87$). Approximately 1.02% or fewer of each of the eight items has missing values (e.g., “refused to answer” or “don’t know”).

Listwise deletion is used in analyses using these variables. Approximately 4.97% of adolescents legitimately skipped the four questions pertaining to maternal support, as there was no resident mother figure in their lives. Approximately 27.14% of adolescents legitimately skipped the four questions pertaining to paternal support, as there was no resident father figure in their lives. Reliability analysis for the analytic sample yielded Cronbach $\alpha = 0.88$.

School support (mediator)

The school support scale contains four items: “You feel close to people at your school.” “You feel like you are part of your school.” “You are happy to be at your school.” and “You feel safe in your school.” Responses are on a 5-point Likert scale (1 = strongly agree / 2 = agree / 3 = neither agree nor disagree / 4 = disagree / 5 = strongly disagree). The four items are reverse coded and summed to represent a total school support score, ranging from a low of 4 to a high of 20. Approximately 1.67% or fewer of each of the four items has missing values (e.g., “legitimate skip” or “don’t know”).

Listwise deletion is used in analyses using these variables. Selection of items mirror those used by Mueller (2009) to study protective factors against depression in gifted and nongifted adolescents using Add Health Wave I data ($\alpha=0.79$). Reliability analysis for this study’s analytic sample yielded Cronbach $\alpha = 0.77$.

Peer Support (mediator)

Add Health is limited in that few questions inquire about support received from peers. Peer support is measured by the item “How much do you feel that your friends care about you?” Responses are on a 5-point Likert scale (1 = not at all / 2 = very little / 3 = somewhat / 4 = quite a bit / 5 = very much). This item has a negligible number of

missing values, fewer than 1%. Listwise deletion is used in analyses using these variables.

Intergenerational network closure (mediator)

Intergenerational network closure is measured by a single item asked of the adolescents' parents: "How many parents of your child's friends have you talked to in the last four weeks?" Responses are 0 = 0 / 1 = 1 / 2 = 2 / 3 = 3 / 4 = 4 / 5 = 5 / 6 = 6 or more. Approximately 10.49% of the cases have missing values and 0.26% of the cases refused to answer this question. Imputed values for these cases are used in analyses, as discussed in the statistical analysis plan below.

Age (control variable)

Age is a continuous variable calculated by subtracting the adolescents' birth date from the interview date. There are no missing values for this measure.

Sex (control variable)

Sex is a dichotomous variable (0 = male / 1 = female). There are no missing values for this measure.

Race/ethnicity (control variable)

Race is a non-mutually exclusive category in Add Health Wave I data. Race/ethnicity is determined in the following order: Hispanic or Latino American, black or African American, Pacific Islander or Asian American, Native American, Other, and non-Hispanic or non-Latino white. This strategy is recommended by the Add Health researchers ("Add Health," 2012). In this study, adolescents who identified as either "Native American" or "Other" are not included in analyses. Native Americans are not an immigrant group and the depressive symptoms dependent variable measure is not

validated for this group, or for the group that selected Other as their race/ethnicity (Perreira et al., 2005). Approximately .05% of the analytic sample had a missing value for race/ethnicity. Approximately 1.99% of the analytic sample is Native American and .84% identify as Other. Once Native American and Other are declared missing, there is a total of 2.89% missing values for the analytic sample. Listwise deletion is used.

Socioeconomic status (control variable)

Socioeconomic status is measured by parents' highest level of education and total household income. The adult residing with the adolescent, who was designated by the adolescent as the mother figure, reported on socioeconomic status. If the mother or stepmother was not available, the following person (in this order of availability) was asked to respond: female guardian, father, stepfather, male guardian. The parent/guardian was asked "How far did you go in school?" (1 = 8th grade or less / 2 = more than 8th grade, but didn't graduate high school / 3 = business/trade/vocational school instead of high school / 4 = high school graduate / 5 = completed a GED / 6 = business/trade/vocational school after high school / 7 = college, but didn't graduate / 8 = graduated from college/university / 9 = professional training beyond 4-year college/university / 10 = never went to school). Approximately 11.66% of the cases have missing values and .07% of the cases refused to answer this question. Imputed values for these cases are used in analyses, as discussed in the statistical analysis plan below. Categories 3 and 10 are declared missing as a negligible number of respondents chose these categories. The variable is dichotomized to 0 = less than high school education / 1 = high school education or more.

Total household income is measured by asking parents “About how much total income, before taxes, did your family receive in 1994? Include your own income, the income of everyone else in your household, and income from welfare benefits, dividends, and all other sources.” Total family income is a ratio level variable. Approximately 12.88% of the cases have missing values and 8.96% of the cases refused to answer this question. Imputed values for these cases are used in analyses, as discussed in the statistical analysis plan below.

Self esteem (control variable)

Self esteem is measured by two items from the Rosenberg (1979) scale: “You have a lot of good qualities” and “You have a lot to be proud of.” Responses are on a 5-point Likert scale (1 = strongly agree / 2 = agree / 3 = neither agree nor disagree / 4 = disagree / 5 = strongly disagree). The two items are reverse coded and summed to represent a total self esteem score, ranging from a low of 2 to a high of 10. This item has a negligible amount of missing values, fewer than 1%. Listwise deletion is used in analyses using these variables. Reliability analysis for the analytic sample yielded Cronbach $\alpha = 0.76$.

Home language (control variable)

Language spoken at home is a nominal-level variable asking “What language is usually spoken at your home?” (1 = English, 2 = Spanish, 3 = Other). There are no missing values for this measure. The variable is recoded to two categories (1 = English / 2 = Other).

Statistical Analysis

The first step in data analysis was to compare the design ($N=4,834$) and analytic samples ($N=4,263$) to confirm a representative analytic sample (see Table A1, p. 93). Descriptive statistics were conducted for all variables under investigation, including central measures of tendency, skewness, and kurtosis. Variables were investigated for level of missing cases. Scales were created for depressive symptoms, school stress, parental support, school support, intergenerational network closure, and self esteem. Reliability analysis was performed on all scales (see Table A3, p. 95). Highly skewed variables were then transformed (see Table A4, p. 95) and dummy variables created for sex, race/ethnicity, and language used at home. One way ANOVA and chi square procedures were conducted on key variables to identify significant differences by generational status. Bivariate correlations were conducted for all variables (see Table 2, p. 59). Multivariate imputation using chained equations was then performed for variables with a moderate to high level of missing values (e.g., intergenerational network closure, parental education, and household income). Ordinary least squares hierarchical regression analysis and Sobel's test for determining the significance of mediation effects were conducted to answer the research questions. Provided below is an overview of hierarchical regression analysis, mediation analysis, and multiple imputation. This is followed by the statistical analysis plan, which outlines the relationship between the study's research questions and the statistical procedures used to answer them. Important to note is that in order to generate unbiased nationally representative results, guidelines provided by Add Health researchers to correct for design effects and unequal probability of selection to participate in Add Health were followed. Only adolescents with values for

the weight variable from the most recent wave of data (Wave II) were included in analyses. A with-replacement design was then assumed and a cluster variable and grand sample weight for Wave II data were used in data analyses. A stratum variable was not used, as it is only available in the restricted use dataset and use of the variable only minimally affects the standard errors (Chantala & Tabor, 1999).

Hierarchical Multiple Regression: An Overview

Hierarchical multiple regression is a statistical procedure that enters independent variables in a regression model in a series of steps that allows researchers to observe what each block of independent variables adds to a regression model in explaining variability in a dependent variable. The order of entry is based on theoretical and/or logical consideration (Polit, 2010). For example, variables may be entered in accordance with a conceptual model or in temporal order according to one's life span. Researchers may also choose to use hierarchical multiple regression to investigate the effects of key independent variables once control variables are accounted for, essentially removing the effect of the control variables. The researcher determines both the number of steps and the number of variables in each step (Polit, 2010). In this study, independent variables are entered in three blocks, based on conceptual and empirical consideration.

Another consideration in regression analysis, using panel data, is from which waves the independent and dependent variables will be drawn. The decision to use independent variables from Wave I data and a dependent variable from Wave II data is based on the criterion of temporal order in mediation analysis. Ideally, predictors, mediators, and outcomes would be measured at more than one point in time (Baron & Kenny, 1986; Frazier, Tix, & Barron, 2004), but the available Add Health data does not

provide for this. Given that depressive symptoms was measured in both Wave I and Wave II of Add Health, using the dependent variable from Wave II data ensures temporal order between the outcome variable and the predictors and mediators, offering a stronger design than using all variables (e.g., predictors, mediators, and controls) from one wave of data.

The lagged dependent variable and change score regression approaches were also considered for this study. The lagged dependent variable approach includes the dependent variable measured at time 1 as an additional independent variable. However, least squares regression assumes no autocorrelation and the use of time series data often leads to violation of this assumption. When autocorrelation is present the lagged dependent variable approach leads to a downward bias of coefficients of explanatory variables (Keele & Kelly, 2005). Preliminary data analysis showed the lagged dependent variable approach led to this downward bias. The change score approach uses the change score (variable at time 2 – variable at time 1) for each of the independent variables and the dependent variable in the regression models. It was not possible to conduct preliminary analysis with a change score approach for all variables, because three of the independent variables are unavailable in Wave II data. It was possible to conduct preliminary analysis with a change score for the dependent variable only. However, the focus of this study was not on conducting mediation analysis to understand the relationship between assimilation and the change in depressive symptoms. Wave I and Wave II data are one year apart and the literature does not indicate an expected change in depressive symptoms over the course of one year. Preliminary analysis demonstrated the dependent variable change score approach lacked explanatory power.

Mediation Analysis: An Overview

A mediator is a variable that explains the relationship between a predictor variable and an outcome variable, offering an explanation as to “how” or “why” the predictor variable influences the outcome variable. Mediation analysis aims to understand the mechanism, or path, between a predictor, mediator, and outcome variable (see Figure 2, p. 47). Mediation analysis offers researchers the opportunity to investigate significant mediators that lead to building and testing theory and focusing interventions on effective mechanisms that are suggested to lead to an identified outcome. Hence, the selection of mediators to investigate should be grounded in a theoretical framework. Mediation analysis should not be confused as a means to determine causality between variables, but rather as a means to identify a *plausible* path by which variables are related to one another (Baron & Kenny, 1986; Frazier, Tix & Baron, 2004).

Mediation analysis moves beyond research that only tests direct relationships between predictors and an outcome variable to research that tests both direct and indirect relationships. It is most commonly performed using multiple regression analysis. A researcher first establishes there is a direct relationship between a predictor and outcome variable, without including any mediator in the analysis (direct relationship). Then, the researcher establishes there is a relationship between the predictor and mediator and a relationship between the mediator and outcome variable (indirect relationships). The strength of the relationship between the predictor and outcome variable *without* the mediator in the model (first step) is compared to the strength of the relationship between the predictor and outcome variable *with* the mediator in the model. If the strength of the relationship between the predictor and outcome variable is significantly reduced when the

mediator is added to the model, this indicates a mediation effect. If the relationship is reduced to zero, this indicates complete mediation. Once the researcher has an indication of a mediation effect, this effect should be tested to determine if it is significant. This part of mediation analysis is often overlooked in the literature (Frazier, Tix, & Baron, 2004). Sobel's test determines if mediation effects are significant by testing the product of the regression coefficients in the mediated path. Sobel's test works best in large samples, such as Add Health, because it assumes a normally distributed sample (Dearing & Hamilton, 2006).



Figure 2: Mediation Analysis

Multiple Imputation: An Overview

Multiple imputation is used to handle moderate or large levels of missing data. If missing data is not handled appropriately, it can lead to biased parameters (e.g., regression coefficients) and incorrect significance tests. Multiple imputation estimates missing values for designated variables by using a researcher determined multivariate model that draws from the distribution of observed data. The process involves the creation of multiple sets of values that are imputed for missing data. Imputed values are different across the sets of values because a stochastic, or random, component of each imputed value is included. For non missing data, across all variables in the dataset, values are constant and consistent with the values in the original dataset (Marchenko, 2011; Widaman, 2006).

This study uses multiple imputation using chained equations (MICE) to handle moderate to large levels of missing data. MICE is an iterative process that uses prediction equations to impute values. It is also known as fully conditional specification or sequential regression multivariate imputation. Missing values are first summarized and explored. Variables with missing values are registered as “imputed.” Variables to be used in the prediction equations are registered as “regular” variables. Conditional models are specified for each variable with missing values to be imputed, where these variables are regressed onto a series of predictors. Of note, a common mistake in using MICE is the omission of the outcome variable in the conditional models. To avoid bias in the final analysis model, conditional models should include *all* the variables in the analysis model (White, Royston, & Wood, 2010). The number of imputations to perform is designated by the researcher and is generally recommended to be between 5 and 10, although some researchers now recommend up to 20 or 25. A strength of MICE is that it can handle different types of variables (e.g., continuous, binary, unordered categorical, and ordered categorical), as each variable is imputed using its own imputation model (Marchenko, 2011; White et al., 2010; Widaman, 2006). Important to note is that MICE is an empirically driven procedure and, like other multiple imputation procedures, assumes data are missing at random (e.g., the probability of missing data is conditional on observed data) (White et al., 2010).

Statistical Analysis Plan

Based on a review of the literature and results from preliminary data analysis, this study uses ordinary least squares hierarchical regression and Sobel’s test to answer the study’s research questions. These statistical procedures are performed after calculation of

descriptive statistics, scale creation, transformation of variables to approach normal distributions, creation of dummy variables, and correlation analysis. Assumptions of multivariate regression (e.g., normality of residuals, linearity, homogeneity of error variance, and independent errors), as well as model specification, are tested for the full regression model. Preliminary analysis using ordinary least squares regression showed the regression assumptions were generally met, with the exception of results from the Breusch-Pagan test which suggested evidence of heteroskedastic errors. Therefore, all regression models use the survey command to account for both the clustering design and unequal probability of selection to participate in Add Health. Missing values are handled using listwise deletion if the number of missing values is small (1-2%), and multiple imputation is used if the number of missing values is moderate (10-24%) (Widaman, 2006). This study does not contain variables with large levels of missing data (25% or more). Three variables in the regression models have a moderate amount of missing data: parental education, household income, and intergenerational network closure. Multivariate imputation using chained equations is used to replace missing values with five sets of simulated values. The unofficial Stata command, mibeta, is used with the weight variable to report standardized betas, as the official Stata command, mi estimate, does not report standardized betas. The weight variable accounting for unequal probability of selection to Add Health is used in lieu of the survey command that accounts for both unequal probability selection and the clustering design, because mibeta does not support survey data. This is a sufficient approach as point estimates for Add Health data are the same if you use the weight and cluster variables or only the weight variable (Chantala & Tabor, 1999). R squared is calculated by taking the mean of the R

squared values for each of the five sets of simulated values. Stata version 12.0 is used for all analyses.

Relationships between Statistical Models and Research Questions

Research question #1 asks: *How does assimilation affect depressive symptoms in adolescents after adjusting for the effect of age, sex, race/ethnicity, socioeconomic status, language spoken at home, and self esteem?* Central to this study is previous research indicating conflicting empirical results on the relationship between assimilation and depressive symptoms. The first research question determines if there is support for new assimilation theory with respect to psychological wellbeing. The net regression model, which includes only assimilation as a predictor and depressive symptoms as an outcome, serves as the starting point for mediation analysis. This is the first step in the ordinary least squares hierarchical regression analysis. If there is a significant relationship between assimilation and depressive symptoms, the investigation of more proximal variables that explain this relationship becomes feasible. The first block in the ordinary least squares regression model includes the two dummy variables that operationalize assimilation: first generation adolescents and second generation adolescents. The reference group is the third-plus generation. The regression equation used to examine this research question is: $Y'(\text{depressive symptoms}) = a + b_1(\text{first generation}) + b_2(\text{second generation})$. $Y'(\text{depressive symptoms})$ represents the predicted value of depressive symptoms, a is the intercept constant, and b_1 and b_2 represent the regression coefficients.

It has been suggested in the literature the reason assimilation theory has not always been upheld empirically is due to socioeconomic and sociodemographic variables not being controlled (Harker, 2001). The second block of variables included in the

ordinary least square regression model adds sex, age, race/ethnicity, parental education, household income, home language, and self esteem to the regression model, highlighted in bold below. The dummy variable for sex is female and the reference group is male. Age is a continuous variable. The dummy variables for race/ethnicity are black or African American, Hispanic or Latino American, and Pacific Islander or Asian American and the reference group is non-Hispanic or non-Latino white. The dummy variable for parental education is that parents have at least a high school education and the reference group is parents who have less than a high school education. Household income is a continuous variable. The dummy variable for home language is English and the reference category is non-English. Self esteem is a continuous variable. The regression equation is: $Y'(\text{depressive symptoms}) = a + b_1(\text{first generation}) + b_2(\text{second generation}) + b_3(\text{age}) + b_4(\text{female}) + b_5(\text{black or African American}) + b_6(\text{Hispanic or Latino American}) + b_7(\text{Pacific Islander or Asian American}) + b_8(\text{household income}) + b_9(\text{parental education}) + b_{10}(\text{English spoken at home}) + b_{11}(\text{self esteem})$.

Research question #2 asks: *How do stress and social supports mediate the relationships between assimilation, age, sex, race/ethnicity, socioeconomic status, language spoken at home and depressive symptoms, when controlling for self esteem?*

This research question extends the inquiry of research question #1, by investigating how stress, parental support, school support, peer support, and intergenerational network closure mediate relationships between assimilation and background variables and depressive symptoms. This question is investigated by the addition of the third block of variables, in bold face below, in the ordinary least squares hierarchical regression model.

The regression equation is: $Y'(\text{depressive symptoms}) = a + b_1(\text{first generation}) +$

$b_2(\text{second generation}) + b_3(\text{age}) + b_4(\text{female}) + b_5(\text{black or African American}) +$
 $b_6(\text{Hispanic or Latino American}) + b_7(\text{Pacific Islander or Asian American}) +$
 $b_8(\text{household income}) + b_9(\text{parental education}) + b_{10}(\text{English spoken at home}) + b_{11}(\text{self esteem}) +$
 $b_{12}(\text{stress}) + b_{13}(\text{parental support}) + b_{14}(\text{school support}) + b_{15}(\text{peer support})$
 $+ b_{16}(\text{intergenerational network closure}).$

Sobel's test determines if the mediation effects identified in the ordinary least squares hierarchical regression analysis are significant. To perform Sobel's tests, five ordinary least squares simultaneous regression models are run to identify significant predictors of each mediator. These five regression models regress each of the five mediators on the assimilation variables from the first block of the hierarchical regression model and the control variables from the second block of the hierarchical regression model. The five regression equations are:

$$\begin{aligned}
 Y'(\text{stress}) = & a + b_1(\text{first generation}) + b_2(\text{second generation}) + b_3(\text{age}) + \\
 & b_4(\text{female}) + b_5(\text{black or African American}) + b_6(\text{Hispanic or Latino American}) + \\
 & b_7(\text{Pacific Islander or Asian American}) + b_8(\text{household income}) + b_9(\text{parental} \\
 & \text{education}) + b_{10}(\text{English spoken at home}) + b_{11}(\text{self esteem})
 \end{aligned}$$

$$\begin{aligned}
 Y'(\text{parental support}) = & a + b_1(\text{first generation}) + b_2(\text{second generation}) + b_3(\text{age}) \\
 & + b_4(\text{female}) + b_5(\text{black or African American}) + b_6(\text{Hispanic or Latino American}) \\
 & + b_7(\text{Pacific Islander or Asian American}) + b_8(\text{household income}) + b_9(\text{parental} \\
 & \text{education}) + b_{10}(\text{English spoken at home}) + b_{11}(\text{self esteem})
 \end{aligned}$$

$$\begin{aligned}
 Y'(\text{school support}) = & a + b_1(\text{first generation}) + b_2(\text{second generation}) + b_3(\text{age}) + \\
 & b_4(\text{female}) + b_5(\text{black or African American}) + b_6(\text{Hispanic or Latino American}) +
 \end{aligned}$$

$b_7(\text{Pacific Islander or Asian American}) + b_8(\text{household income}) + b_9(\text{parental education}) + b_{10}(\text{English spoken at home}) + b_{11}(\text{self esteem})$

$Y'(\text{peer support}) = a + b_1(\text{first generation}) + b_2(\text{second generation}) + b_3(\text{age}) + b_4(\text{female}) + b_5(\text{black or African American}) + b_6(\text{Hispanic or Latino American}) + b_7(\text{Pacific Islander or Asian American}) + b_8(\text{household income}) + b_9(\text{parental education}) + b_{10}(\text{English spoken at home}) + b_{11}(\text{self esteem})$

$Y'(\text{intergenerational network closure}) = a + b_1(\text{first generation}) + b_2(\text{second generation}) + b_3(\text{age}) + b_4(\text{female}) + b_5(\text{black or African American}) + b_6(\text{Hispanic or Latino American}) + b_7(\text{Pacific Islander or Asian American}) + b_8(\text{household income}) + b_9(\text{parental education}) + b_{10}(\text{English spoken at home}) + b_{11}(\text{self esteem})$

Paths originating from significant predictors, and in accordance with the study's conceptual model (see Figure 1, p. 16), are tested.

Chapter IV. Results

This chapter reports results of descriptive and inferential statistical procedures used to answer the study's guiding research questions. Emphasis is on findings from the ordinary least square hierarchical regression analysis and Sobel's test. In the following chapter, findings are discussed within the context of this study's research questions, theoretical framework, and recent literature.

The analytic sample ($N=4,263$) of adolescents in grades seven through twelve report a mean age of 15.53 and a mean depressive symptoms score of 2.37 out of 15. Approximately half the sample, 50.54%, is male and the majority are white, 68.5%. Approximately 14.74% are black or African American, 13.21% are Hispanic or Latino American, and 3.55% are Pacific Islander or Asian American. The majority of adolescents speak English at home, 92.3%. The mean household income is \$47,310 and the majority of parents have a high school education, 84.65% (see Table 1, p. 57).

One way ANOVA and chi square tests were conducted to identify significant differences within the sample by key variables and generational status. Unweighted, non imputed data were used in these analyses, as the Stata commands for these procedures do not support the survey command. For one way ANOVA, if the assumption of homogeneity of variance was violated, population variances for all groups were calculated and compared. When this assumption is violated, accurate results are still produced as long as the population variance for one group is no more than three times the variance of another group (Polit, 2010, p. 139). This assumption was violated for stress, peer support, and intergenerational network closure. Comparison of variances for each generational group by these variables yielded no group exceeded three times the variance

of another group. For chi-square analyses, it was possible to detect presence of significant differences, but identifying the specific groups was not possible. Post hoc procedures are generally unavailable in commonly used statistical software packages (Polit, 2010, p. 175), and were unavailable in Stata.

Prior to conducting inferential statistics, highly skewed variables were transformed to approximate normal distributions. Variables with absolute values of skew above .80 were transformed. A square root transformation of the dependent variable, depressive symptoms, reduced the skew from 1.52 to .04. Square root transformations were performed for self esteem, stress, school support, and peer support. The skew for self esteem was reduced from -1.00 to -.22; for stress, .94 to -.45; for school support, -1.45 to -.38; and for peer support, -.98 to -.52. A log transformation was performed for household income, reducing the skew from 8.01 to -.84. These transformations resulted in lower kurtosis for all variables (see Table A4, p. 95).

In comparing depressive symptoms across generations, first and second generation adolescents report significantly higher levels of depressive symptoms ($M = 2.77$, $SD = .22$ and $M = 2.81$, $SD = .14$ respectively), than third-plus generation adolescents, ($M = 2.29$, $SD = .05$) on a scale ranging from 0 to 15 ($F(2, 4,260) = 28.50$, $p < .001$). First generation adolescents are older than second and third generation adolescents by about one year ($F(2, 4,260) = 20.34$, $p < .001$). There are no significant differences among the generations by sex ($X^2(2, N = 4,263)$, $p = .42$). Hispanics or Latino Americans constitute the largest ethnic/racial group reported among first generation adolescents, 62.63%, and second generation adolescents, 48.21%. Only 5.10% of third-plus generation adolescents are Hispanics or Latino Americans. Results

of the chi square test indicate there are significant differences by race and generational status ($\chi^2(6, N = 4,140), p < .001$); however, Stata commands do not support post hoc analyses to identify significant differences between specific groups. Mean reported household income and parental education are lower among first and second generation adolescents. Mean household income for first generation adolescents is approximately \$27,780, as compared to \$43,990 for second generation and \$48,650 for third-plus generation adolescents. This difference is significant among first and second generation adolescents and first and third generation adolescents ($F(2, 3,329) = 31.33, p < .001$). The mean difference between the second and third generations approaches significance at the $p < .10$ level ($p = .11$). Over half of parents of first generation adolescents have less than a high school education, 51.70%, and approximately 34% of parents of second generation adolescents have less than a high school education. Significant differences are found by generational status for parental education ($\chi^2(2, N = 3,740), p < .001$). English is not spoken in the homes of approximately 78.03% of first generation adolescents and 28.32% of second generation adolescents, as compared to less than 1% of third-plus generation adolescents (see Table 1, p. 57). Chi-square analysis shows there are significant mean differences in home language use by generational status ($\chi^2(2, N = 4,263), p < .001$).

In considering stress, social supports, and self esteem, descriptive statistics reveal immigrant disadvantages, with the exception of school related stress. First and second generation adolescents report lower mean levels of school related stress ($M = 3.11, SD = .24$ and $M = 3.89, SD = .15$ respectively), than third-plus generation adolescents ($M =$

4.25, $SD = .06$). These differences are significant between the first and second generations and the first and third generations ($F(2, 4,260) = 17.31, p < .001$).

Table 1

Variables Used in Regression Analysis^a – Mean(SD) or %

	Analytic Sample ($N=4,263$)	Gen 1 ($n=213$)	Gen 2 ($n=510$)	Gen 3 ($n=3,540$)
Depressive symptoms (0-15)	2.37(.05)	2.77(.22)	2.81(.14)	2.29(.05)
Age	15.53(.11)	16.19(.23)	15.41(.15)	15.51(.11)
Sex				
Male	50.54	46.87	49.27	50.95
Female	49.46	53.13	50.73	49.05
Household income ^b	47.31(2.19)	27.78(3.75)	43.99(3.84)	48.65(2.24)
Parental education				
Less than high school	15.35	51.7	34.35	10.90
High school	84.65	48.3	65.65	89.10
English at home				
No	7.70	78.03	28.32	.43
Yes	92.30	21.97	71.68	99.57
Race				
Hispanic/Latino American	13.21	62.63	48.21	5.10
Black/African American	14.74	1.79	7.05	16.65
Pacific Islander/Asian Am.	3.55	29.66	14.08	0.43
Non-Hisp./non-Latino white	68.50	5.92	30.65	77.82
Self esteem (2-10)	8.54(.03)	7.95(.11)	8.35(.07)	8.61(.03)
Stress (0-16)	4.15(.06)	3.11(.24)	3.89(.15)	4.25(.06)
Parental support (8-40)	30.94(.17)	29.98(.44)	30.31(.46)	31.09(.17)
School support (4-20)	14.86(.11)	15.06(.37)	14.59(.20)	14.89(.12)
Peer support (1-5)	4.23(.02)	3.98(.08)	4.18(.04)	4.25(.02)
Intergenerational network closure (0-6)	2.23(.07)	.90(.10)	1.77(.08)	2.35(.08)

^aWeighted, non-imputed data

^bHousehold income is reported in thousands

Although first generation immigrants report the highest levels of school support, 15.06 out of 20; this is not a significant difference among the generational groups ($F(2, 4,260) = 2.50, p = .08$). First and second generation adolescents report lower significant mean levels of self esteem, ($M = 7.95, SD = .11$ and $M = 8.35, SD = .07$ respectively), than third-plus generation adolescents ($M = 8.61, SD = .03$) ($F(2, 4,260) = 34.69, p < .001$).

They also report lower levels of parental support, peer support, and intergenerational network closure than third-plus generation adolescents (see Table 1, p. 57). The mean difference in parental support is significant among first ($M = 29.98$, $SD = .44$) and third generation ($M = 31.09$, $SD = .17$) adolescents ($F(2, 4,260) = 4.29$, $p = .01$) and approaches significance for second ($M = 30.31$, $SD = .46$) and third generation adolescents at the $p < .10$ level ($p = .11$). The mean difference in peer support is significant among first ($M = 3.98$, $SD = .08$) and third generation ($M = 4.25$, $SD = .02$) adolescents ($F(2, 4,250) = 8.39$, $p < .001$). The mean differences in intergenerational network closure between first ($M = .90$, $SD = .10$) and third generation ($M = 2.35$, $SD = .08$) and second ($M = 1.77$, $SD = .08$) and third generation adolescents are significant ($F(2, 3,802) = 53.91$, $p < .001$).

Correlation analysis demonstrated significant relationships between all predictor and mediator variables and depressive symptoms at the $p < .05$ level, with the exception of the relationship between a black or African American racial/ethnic identity and depressive symptoms, which is significant at the $p < .10$ level. The strongest relationships are between self esteem and depressive symptoms ($r(3161) = -.25$, $p < .05$), parental support and depressive symptoms ($r(3161) = -.24$, $p < .05$), school support and depressive symptoms ($r(3161) = -.23$, $p < .05$), stress and depressive symptoms ($r(3161) = .21$, $p < .05$), intergenerational network closure and depressive symptoms ($r(3161) = -.12$, $p < .05$), and female and depressive symptoms ($r(3161) = .11$, $p < .05$). Both first generation status and depressive symptoms ($r(3161) = .05$, $p < .05$) and second generation status and depressive symptoms ($r(3161) = .09$, $p < .05$) are significantly, positively, and weakly correlated (see Table 2, p. 59).

Table 2

Correlation Analysis with Variables used in OLS Regression (N=3,163)^a

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. Depressive symptoms																
2. Generation 1	.049*															
3. Generation 2	.088*	-.070*														
4. Female	.108*	.014	.018													
5. Age	.094*	.093*	-.021	-.070*												
6. Black	.030	-.081*	-.071*	.027	.005											
7. Hispanic	.091*	.333*	.363*	.002	.020	-.181*										
8. Asian	.052*	.240*	.260*	-.011	-.000	-.094*	-.064*									
9. Parental Education	-.102*	-.203*	-.162*	-.001	-.061*	-.009	-.297*	-.007								
10. Income	-.090*	-.130*	-.031	.014	-.043*	-.161*	-.143*	.028	.291*							
11. English	-.094*	-.582*	-.270*	-.025	-.077*	.121*	-.525*	-.177*	.324*	.161*						
12. Self Esteem	-.251*	-.076*	-.051*	-.101*	-.090*	.129*	-.051*	-.074*	.052*	.051*	.087*					
13. Parental Support	-.242*	-.033	-.048*	-.097*	-.143*	-.138*	-.042*	-.002	.049*	.260*	.050*	.322*				
14. School Support	-.227*	-.012	-.027	-.019	-.115*	-.063*	-.005	-.008	.053*	.074*	.022	.302*	.296*			
15. Peer Support	-.097*	-.063*	-.036*	.181*	-.026	-.110*	-.046*	-.040*	.073*	.108*	.059*	.185*	.164*	.229*		
16. Network Closure	-.118*	-.133*	-.088*	.058*	-.120*	-.134*	-.131*	-.069*	.179*	.205*	.157*	.072*	.163*	.177*	.142*	
17. Stress	.207*	-.074*	-.010	-.152*	.008	-.011	-.048*	.004	.039*	.012	.082*	-.155*	-.175*	-.190*	-.114*	-.016

^aUnweighted, non imputed data and listwise deletion used

Note. Racial/ethnic categories are abbreviated: black or African American, Hispanic or Latino American, Pacific Islander or Asian American. Reference groups are male, non-Hispanic/non-Latino white, parents with less than high school education, and non-English home language.

* $p < .05$

Multiple imputation using chained equations was used to impute data from five sets of simulated values for variables with moderate levels of missing data (10-24%). Parental education, household income, and intergenerational network closure had moderate levels and arbitrary patterns of missing data (11.73%, 21.84%, and 10.75% respectively). Approximately 514 values were imputed for parental education, 907 for household income, and 451 for intergenerational network closure. For scale variables, each item on the scale was examined for missing values. For example, the depressive symptoms scale had less than 1% missing values for each item (see Table A2, p. 94).

To investigate relationships between generation status, mediators, and depressive symptoms, ordinary least squares hierarchical regression analysis was performed in three blocks using multiply imputed data and the Add Health recommended cluster variable and grand sample weight. The significant net regression model includes first generation and second generation status as predictors of depressive symptoms in adolescents, with third-plus generation adolescents as the reference group ($R^2 = .01$, $F(2, 4126) = 13.63$, $p < .01$). First generation and second generation status are significant predictors of depressive symptoms, with both first generation immigrants and second generation immigrants more likely to experience depressive symptoms than their third-plus generation peers. If the adolescent is first generation, the depressive symptoms score increases by .06 standard deviations over the third-plus generation adolescents' depressive symptoms score, when all other variables are controlled ($p < .01$). If the adolescent is second generation, the depressive symptoms score increases by .07 standard deviations over the third-plus generation adolescents' depressive symptoms score, when all other variables are controlled ($p < .01$). The net model offers a negligible prediction

of depressive symptoms in adolescents, with less than 1% of the variability accounted for by generational status (see Table 3 below).

Table 3

Ordinary Least Squares Hierarchical Regression (N=4,131)^a

		Depressive Symptoms		
		Model 1	Model 2	Model 3
Step	Predictor	Beta Weights		
1	<i>Assimilation</i>			
	First generation	.057*	-.021	-.007
	Second generation	.072*	.013	.012
2	<i>Background Variables</i>			
	Female		.093*	.123*
	Age		.080*	.047*
	Black or African American		.081*	.050*
	Hispanic or Latino American		.077*	.058*
	Pacific Islander or Asian American		.057*	.050*
	Parental education at least high school		-.052*	-.054*
	Household income		-.057*	-.017
	English as home language		.025	-.001
	Self esteem		-.225*	-.123*
3	<i>Mediators</i>			
	Stress			.171*
	Parental support			-.117*
	School support			-.089*
	Peer support			-.041*
	Intergenerational network closure			-.037*
	<i>R² change</i>	.008*	.089*	.065*
	<i>Cumulative R²</i>	.008*	.097*	.162*

^a Multiply imputed, weighted data

Note. Reference groups are male, non-Hispanic/non-Latino white, parents have less than a high school education, and non-English home language.

* $p \leq .05$

The second block of variables entered in the ordinary least squares regression model includes female, age, black or African American, Hispanic or Latino American, Pacific Islander or Asian American, parents with high school education, household income, English as the home language, and self esteem. This model is an improvement

over the net model ($R^2 = .09$, $F(11, 3470) = 32.73$, $p < .01$). First generation ($p = .37$) and second generation status ($p = .55$) are no longer significant predictors of depressive symptoms and the direction of the regression coefficient for first generation reversed, when background variables were controlled. Of the additional background variables entered in this second block, only English language spoken at home is not a significant predictor of depressive symptoms in adolescents ($p = 0.32$). If the adolescent is female, the depressive symptoms score increases by .09 standard deviations over male adolescents' score, when all other variables are controlled ($p < .01$). A one standard deviation increase in age yields a .08 standard deviation increase in the predicted depressive symptoms score, when all other variables are controlled ($p < .01$). If the adolescent is black or African American, the depressive symptoms score increases by .08 standard deviations over non-Hispanic, non-Latino white adolescents' score, when all other variables are controlled ($p < .01$). If the adolescent is Hispanic or Latino American, the depressive symptoms score increases by .08 standard deviations over non-Hispanic, non-Latino white adolescents' score, when all other variables are controlled ($p < .01$). If the adolescent is Pacific Islander or Asian American, the depressive symptoms score increases by .06 standard deviations over non-Hispanic, non-Latino white adolescents' score, when all other variables are controlled ($p < .01$). If the adolescents' parents have at least a high school education, the depressive symptoms score decreases by .05 standard deviations over adolescents whose parents have less than a high school education, when all other variables are controlled ($p = .02$). A one standard deviation increase in household income yields a .06 standard deviation decrease in the predicted depressive symptoms score, when all other variables are controlled ($p = .01$). A one standard

deviation increase in self esteem yields a .23 standard deviation decrease in the predicted depressive symptoms score, when all other variables are controlled ($p < .01$) (see Table 3, p. 61). This analysis shows background variables, *rather than assimilation*, account for differences in depressive symptoms scores among adolescent immigrants and adolescent natives. The strongest predictor is self esteem, followed by sex, age, race/ethnicity, and socioeconomic status. This model explains 9.74% of the variability in depressive symptoms scores among adolescents (see Table 3, p. 61).

The third and final block of variables entered in the ordinary least squares hierarchical regression analysis includes stress, parental support, school support, peer support, and intergenerational network closure. This model is significant and an improvement over the second model ($R^2 = .16$, $F(16, 3671) = 40.87$, $p < .001$). First generation status ($p = .77$), second generation status ($p = .56$), and English as the home language ($p = .98$) remain non significant predictors of depressive symptoms, when all other variables are controlled. All social support variables and stress are significant predictors of depressive symptoms ($p < .05$). A one standard deviation increase in stress yields a .17 standard deviation increase in the depressive symptoms score, when all other variables are controlled ($p < .01$). A one standard deviation increase in parental support yields a .12 standard deviation decrease in the depressive symptoms score, when all other variables are controlled ($p < .01$). A one standard deviation increase in school support yields a .09 standard deviation decrease in the depressive symptoms score, when all other variables are controlled ($p < .01$). A one standard deviation increase in peer support yields a .04 standard deviation decrease in the depressive symptoms score, when all other variables are controlled ($p = .02$). A one standard deviation increase in intergenerational

network closure yields a .04 standard deviation decrease in the depressive symptoms score, when all other variables are controlled ($p = .05$) (see Table 3, p. 61). In comparing this model to the previous model, household income is no longer a significant predictor of depressive symptoms. The strongest significant predictor of adolescent depressive symptoms is stress, followed by sex, self esteem, and parental support. This model explains 16.17% of the variability in depressive symptoms among adolescents (see Table 3, p. 61).

The final model also demonstrates a reduction in the regression coefficients of background variables, suggesting the third block of variables are mediators of depressive symptoms. The standardized regression coefficients for the predictors, first generation and second generation, are marginally reduced from model 2 to model 3 (-.02 to -.01 and .01 to .01 respectively). Standardized beta for age is .08 in model 2 and .05 in model 3. Standardized betas for black or African American, Hispanic or Latino American, and Pacific Islander or Asian American are reduced from .08 to .05, .08 to .06, and .06 to .05 respectively. Standardized beta for household income reduced from -.06 to -.02 and household income is no longer significant in model 3, suggesting stress and social supports almost completely mediate the relationship between household income and depressive symptoms. Standardized beta for English language spoken at home reduced from .03 to -.00. Standardized beta for self esteem had the greatest reduction among predictors, from -.23 to -.12. Standardized beta for the predictor “parents with a high school education” increased by a negligible amount from model 2 to model 3, -.05 to -.05. The predictor “female” increased from model 2 to model 3, .09 to .12 (see Table 3, p. 61). These results support findings from model 2 that show background variables,

rather than assimilation, account for differences in depressive symptoms among adolescent immigrants and adolescent natives. The final model suggests stress, parental support, school support, peer support, and intergenerational network closure are mediators in the relationship from *background variables* to depressive symptoms in United States adolescents.

Sobel's test was performed for each significant predictor of depressive symptoms in the second hierarchical regression model that was also deemed a predictor in the conceptual model of this study (see Figure 1, p. 16). This ensures a theoretically driven approach that follows guidelines for mediation analysis. For example, when the mediators were regressed on the background variables, self esteem was often a significant correlate. However, conceptually self esteem is an outcome, not a predictor, of the mediators. Another example pertains to three background variables. As discussed in the overview on mediation analysis, the first step is to determine a significant relationship between the predictor and outcome without the mediators in the model. Findings from the second step in the hierarchical regression model showed first generation status, second generation status, and English as a home language were not significant predictors of depressive symptoms. Therefore, paths originating from these three variables were not investigated.

Results from the five simultaneous regression analyses show significant correlates of stress are first generation status, sex, English as the home language, self esteem ($p < .01$), and a Hispanic or Latino American race/ethnicity ($p = .03$) ($R^2 = .06$, $F(11, 3834) = 17.91$, $p < .01$). Significant correlates of parental support are sex, age, black or African American race/ethnicity, parental education, household income, self esteem ($p < .01$), and

English as the home language ($p = .02$) ($R^2 = .22$, $F(11, 3588) = 88.96$, $p < .001$).

Significant correlates of school support are age, black or African American race/ethnicity, self esteem ($p < .01$), and household income ($p = .05$) ($R^2 = .12$, $F(11, 4011) = 34.17$, $p < .001$). Significant correlates of peer support are sex, black or African American race/ethnicity, household income, and self esteem ($p \leq .01$) ($R^2 = .10$, $F(11, 3363) = 32.17$, $p < .001$). Significant correlates of intergenerational network closure are first generation status ($p = .04$), sex ($p = .05$), age, black or African American race/ethnicity, Hispanic or Latino American race/ethnicity, Pacific Islander or Asian American race/ethnicity, parental education, household income, and self esteem ($p < .01$) ($R^2 = .13$, $F(11, 497.70) = 36.65$, $p < .001$). With the results from these regression analyses, Sobel's test was performed to identify significant mediation effects from background variables to depressive symptoms.

The following paths were tested:

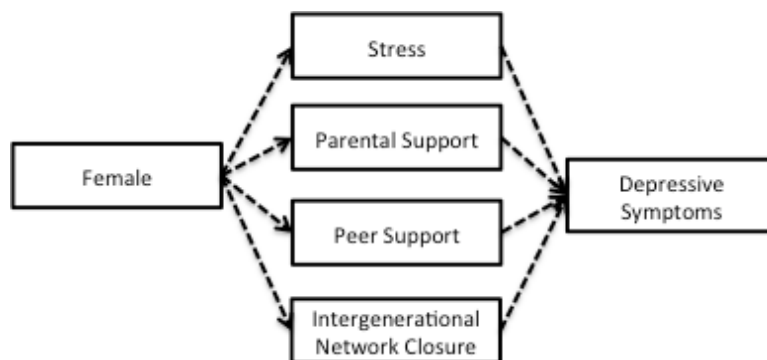


Figure 3: Proposed model showing how stress and social supports mediate the relationship between sex and depressive symptoms in adolescents

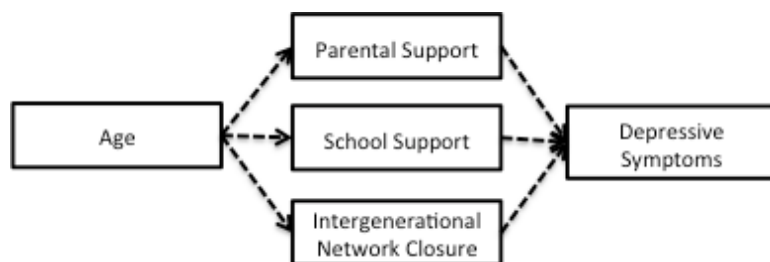


Figure 4: Proposed model showing how social supports mediate the relationship between age and depressive symptoms in adolescents

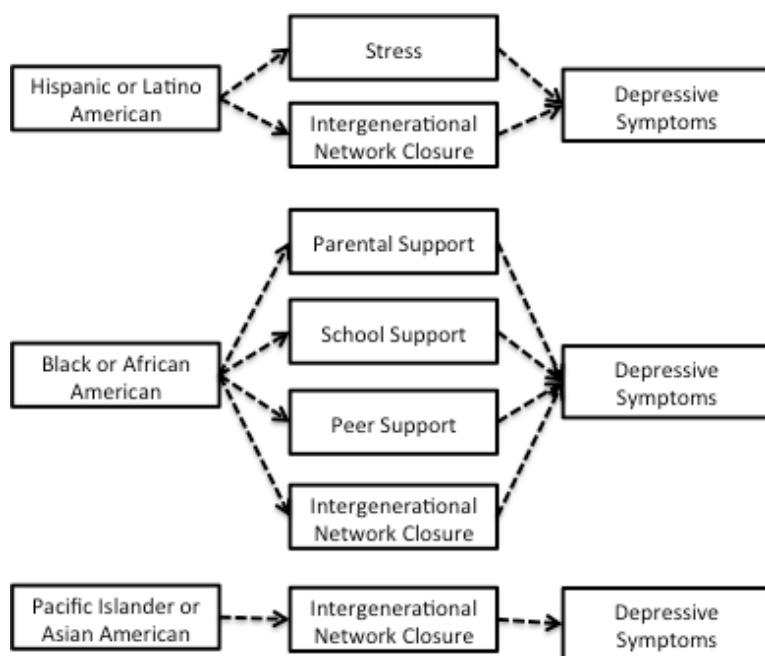


Figure 5: Proposed model showing how stress and social supports mediate the relationship between race/ethnicity and depressive symptoms in adolescents

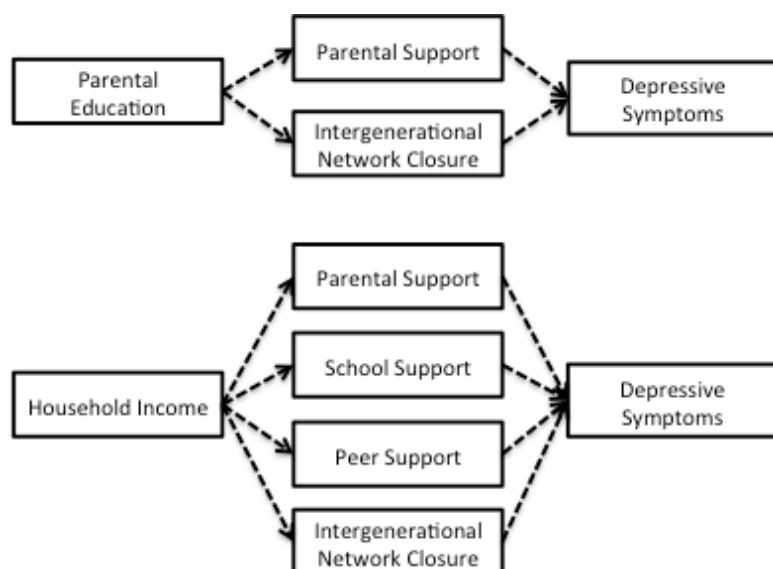


Figure 6: Proposed model showing how social supports mediate the relationship between socioeconomic status and depressive symptoms in adolescents

Results yield 15 of the 20 mechanisms tested have significant mediation effects at the $p < .05$ level (see Figures 7-10, pp. 70-72). Stress has a significant mediation effect on the paths from sex to depressive symptoms and having a Hispanic or Latino American race/ethnicity to depressive symptoms. Although overall females are at increased risk of depressive symptoms (see Table 3, p. 61), they also report less stress than males, which serves as a protective factor against depressive symptoms (see Figure 7, p. 70).

Hispanics or Latino Americans report more stress than non-Hispanic, non-Latino whites, which is associated with an increase in depressive symptoms (see Figure 9, p. 71). Stress was not a significant mediator for other background variables.

Parental support has a significant mediation effect on the paths from sex to depressive symptoms, age to depressive symptoms, having a black or African American race/ethnicity to depressive symptoms, parental education to depressive symptoms, and

household income to depressive symptoms. Females, older adolescents, black or African American adolescents, and adolescents with parents who have at least a high school education receive significantly less parental support than males, younger adolescents, non-Hispanic/non-Latino white adolescents, and adolescents with parents who have less than a high school education, putting them at increased risk for depressive symptoms (see Figures 7-10, pp. 70-72). Adolescents with larger household incomes receive significantly more parental support than adolescents with smaller household incomes, putting them at a decreased risk of depressive symptoms (see Figure 10, p. 72).

School support has a significant mediation effect on the paths from age to depressive symptoms and having a black or African American race/ethnicity to depressive symptoms. Older adolescents and black or African American adolescents receive significantly less school support than younger adolescents and non-Hispanic, non-Latino white adolescents, putting them at increased risk for depressive symptoms (see Figures 8 and 9, p. 71). School support was not a significant mediator for other background variables.

Peer support has a significant mediation effect on the paths from sex to depressive symptoms and having a black or African American race/ethnicity to depressive symptoms. Females have significantly more peer support than males, which offers them a protective factor against depressive symptoms (see Figure 7, p. 70). Black or African American adolescents have significantly less peer support than non-Hispanic, non-Latino white adolescents, putting them at increased risk of depressive symptoms (see Figure 9, p. 71). Peer support was not a significant mediator for other background variables.

Intergenerational network closure has a significant mediation effect on the paths from age to depressive symptoms, black or African American race/ethnicity to depressive symptoms, parental education to depressive symptoms, and household income to depressive symptoms. Older adolescents and black or African American adolescents have significantly less intergenerational network closure than younger adolescents and non-Hispanic, non-Latino white adolescents, putting them at increased risk for depressive symptoms (see Figures 8 and 9, p. 71). Adolescents with higher socioeconomic status have significantly more intergenerational network closure than adolescents with lower socioeconomic status, providing them with a protective factor against depressive symptoms (see Figure 10, p. 72). Intergenerational network closure was not a significant mediator for other background variables.

These findings highlight the importance of testing for significant mediation effects, which is often overlooked in the literature. Findings are discussed in the next chapter, within the conceptual framework of this study (see Figure 1, p. 16).

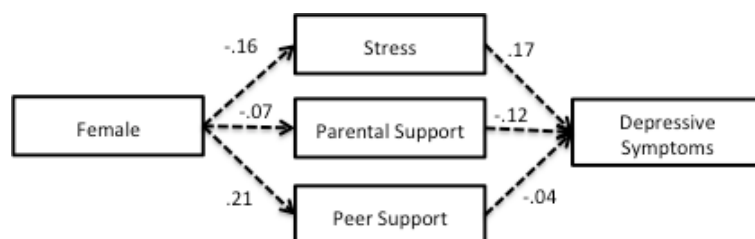


Figure 7: How stress and social supports mediate the relationship between sex and depressive symptoms in adolescents

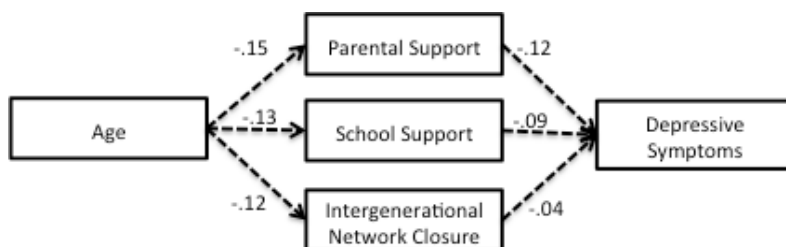


Figure 8: How social supports mediate the relationship between age and depressive symptoms in adolescents

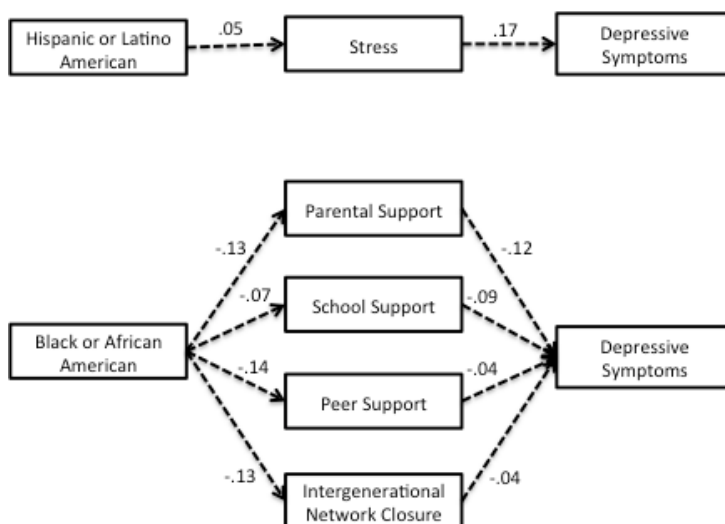


Figure 9: How stress and social supports mediate the relationship between race/ethnicity and depressive symptoms in adolescents

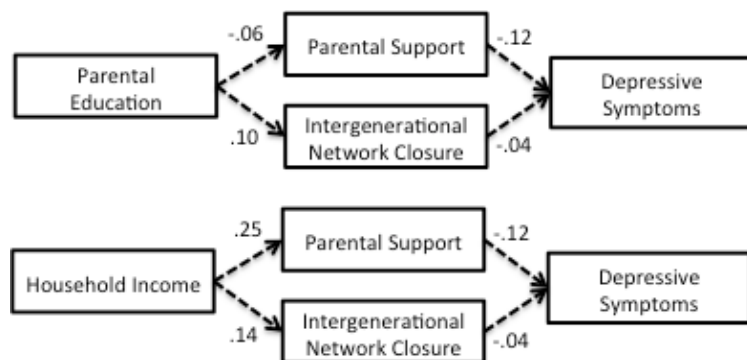


Figure 10: How social supports mediate the relationship between socioeconomic status and depressive symptoms in adolescents

Chapter V. Discussion

The key aim of this study is to investigate a pathway from assimilation to depressive symptoms, considering stress, parental support, school support, peer support, and intergenerational network closure as mediators. Immigrant adolescents report significantly more depressive symptoms than third-plus generation adolescents, but findings show the reason is not due to assimilation, as measured by generational status. This raises questions about assimilation theories premised on the assumption that immigrants face unique migratory related challenges that are associated with adverse outcomes and can be overcome with time as immigrants assimilate to the new culture. Findings show immigrant adolescents are more likely to be non-white, older, from lower socioeconomic status families, and have lower self esteem than their third-plus generation counterparts (see Table 1, p. 57). These known risk factors in adolescence give them a greater likelihood of experiencing depressive symptoms (Adkins et al., 2009; Costello et al., 2008; Harker, 2001; Meadows, 2007; Mueller, 2009; Van Voorhees et al., 2008) than third-plus generation adolescents. Another key finding is that stress, parental support, school support, peer support, and intergenerational network closure are mediators of depressive symptoms that have *unique* relationships with individual risk and protective factors. This finding extends research on risk and protective factors of depressive symptoms in adolescence that suggests overall mediation effects, but does not test for significance. This can contribute to misconceptions that supports interact consistently across background variables. Previous studies also fail to use nationally representative data and a validated measure of depressive symptoms by generational status and race/ethnicity for the United States adolescent population (Perreira et al., 2005).

This study's conceptual model (see Figure 1, p. 16) is guided by new assimilation theory, social network theory, and the Berkman et al. (2000) conceptual model of how social networks impact health (see Figure A1, p. 92). Assimilation is measured as first generation, second generation, and third-plus generation status and included as a key predictor in the mediation model. Control variables include sex, age, race/ethnicity, socioeconomic status, home language, and self esteem. Stress and social supports are investigated as mediators in the relationship between assimilation and background variables and depressive symptoms.

The first research question asks how assimilation is related to depressive symptoms in adolescents after adjusting for the effect of age, sex, race/ethnicity, socioeconomic status, language spoken at home, and self esteem. Empirical studies show disparities in depressive symptoms among immigrants and natives are reduced, and in some cases cease to exist, when background variables are controlled (Harker, 2001). It was expected that the relationship between assimilation and depressive symptoms would, at a minimum, be reduced. Findings show first and second generation adolescents in the United States report significantly more depressive symptoms than third-plus generation adolescents (see Table 1, p. 57). The positive, weak correlations between first generation status and depressive symptoms and second generation status and depressive symptoms are significant (see Table 2, p. 59). However, multivariate regression analysis results show significant differences in levels of depressive symptoms by generational status cease to exist when background variables are controlled. At the center of new assimilation theory is the assumption that immigrants face *unique migratory related* obstacles that will be overcome with increased assimilation. The lack of significance in

the relationship between assimilation and depressive symptoms, once background variables are controlled, calls this premise into question. As Xu et al. (2010) concisely state, the foreign born face similar challenges to all minority adolescents in the United States, but migration related factors (e.g., foreign born status, foreign language spoken at home, United States resident status, and years spent in the United States) are not additional risk factors. Findings are congruent with structural assimilation theory, in finding that background variables of race/ethnicity and parental human capital, rather than increased generational status in the United States, account for changes in psychological outcomes (Portes & Rivas, 2011). However, interpretations must be made with caution as structural assimilation theory is primarily concerned with socioeconomic outcomes. Critical to understand is that racial and ethnic disparities in the United States cannot be underestimated and conclusions regarding assimilation are often dependent on the background characteristics of the groups of immigrants studied and to which groups they are compared. This has become the subject of recent debate in the literature (Alba et al., 2011; Haller et al., 2011). Although outside the scope of this study, this study's findings suggest further investigation is merited within groups of immigrants and among adolescents from similar racial/ethnic backgrounds by generational status.

The second research question addresses how stress and social supports act as mediators of depressive symptoms in adolescents. Findings show the mechanisms by which background characteristics impact depressive symptoms in adolescents are more complex than those presented in the literature (Berkman et al., 2000) and this study's conceptual model (Figure 1, p. 16). Assimilation is not a key predictor of depressive symptoms. However, this finding should not be misinterpreted to suggest adolescent

children of immigrants are not at greater risk of experiencing depressive symptoms in comparison to their native peers. Evidence shows immigrant children are more likely to exhibit background factors associated with increases in depressive symptoms (see Table 1, p. 57). Also, hierarchical regression analysis suggests the five mediators tested are all significant predictors of depressive symptoms, with stress being the strongest predictor, followed by parental support, school support, and then a relatively similar strength in prediction by peer support and intergenerational network closure (see Table 3, p. 61). Sobel's test for significant mediation effects identified distinct pathways from background variables to depressive symptoms. Multivariate hierarchical regression analysis yielded the expected positive association between stress and depressive symptoms (Adkins et al., 2009; Shen & Takeuchi, 2001) and the expected negative relationships between parental support and depressive symptoms (Harker, 2001; Nguyen et al., 2011; Sabatier & Berry, 2008; Ying & Han, 2008), school support and depressive symptoms (Costello et al., 2008; Meadows, 2007; Mueller, 2009), and peer support and depressive symptoms (Costello et al., 2008; Nguyen et al., 2011; Van Voorhees et al., 2008; Walsh et al., 2010). A prediction was not made regarding the relationship between intergenerational network closure and depressive symptoms. The significant, negative relationship provides evidence for Coleman's (1988) conceptualization of this unique support for children (see Table 3, p. 61). Overall, findings support social network theory and the Berkman et al. (2000) conceptual model of how social networks impact health (see Figure A1, p. 92). Adolescents with more social supports experience less depressive symptoms. Also, socio-structural components of a society are likely to influence social supports. For example, results indicate increases in parental human capital and changes

in structural systems that address issues of race/ethnicity will be associated with a reduction in depressive symptoms via supports.

Findings from Sobel's test support expected relationships that females (Adkins et al., 2009; Meadows et al., 2006; Mueller, 2009) and older adolescents (Harker, 2001; Mueller, 2009; Needham, 2008) experience higher levels of depressive symptoms than males and younger adolescents. Females possess risk and protective factors. Protective factors are less school related stress and receipt of more peer support than males. Less parental support is a risk factor. School support and intergenerational network closure are not significant mediators. Findings are consistent with findings from Meadows (2007) that female adolescents report lower mean school-related stress scores, higher peer support, and lower mean parental support than males ($p < .001$). However, Meadows (2007) did not investigate these protective and risk factors in a mediation model for immigrant and native adolescents. Worth mention is the finding that females have a higher baseline score of depressive symptoms than males (Meadows et al., 2006). For older adolescents, study findings show they are more likely to receive less parental support, school support, and intergenerational network closure. Stress and peer support are not significant mediators. With respect to immigrant adolescents, in addition to being approximately a year older than native peers, they report significantly less parental support, peer support and intergenerational network closure, placing them at greater risk of depressive symptoms. Stefanek et al. (2012) found a significant difference in age between first generation immigrants and second and third-plus generation immigrants. Meadows (2007) used nationally representative data and structural equation modeling to show increased age is associated with less school support in both male and female

adolescents ($p < .001$). The literature is scant on the relationship between age and the other mediators investigated.

The expected positive relationship between a racial/ethnic minority status and increased depressive symptoms (Adkins et al., 2009; Anderson & Mayes, 2010; Costello et al., 2008) was found. The only significant mediator for Hispanics or Latino Americans is stress. They are more likely to experience school related stress than whites, placing them at increased risk for depressive symptoms. None of the five mediators tested, stress, parental support, school support, peer support, and intergenerational network closure, are significant for Pacific Islander or Asian Americans. Blacks or African Americans receive significantly less parental support, school support, peer support, and intergenerational network closure than non-Hispanic, non-Latino whites, placing them at increased risk for depressive symptoms. Stress is not a significant mediator of depressive symptoms for blacks or African Americans. These findings highlight the greater risks associated with being part of racial and ethnic minority groups in the United States, and most specifically the black/African American racial/ethnic group.

Findings confirm being from a household with lower socioeconomic status is a risk factor for depressive symptoms in adolescence (Costello et al., 2008; Harker, 2001; Jackson & Goodman, 2011). Results suggest near complete mediation of the effect of household income on depressive symptoms, with the addition of stress and social supports in the model. The effect of parental education remains approximately the same. Mediation analysis indicates it is through parental support and intergenerational network closure that depressive symptoms are impacted. Adolescents from households with higher incomes report more parental support and intergenerational network closure,

which serve as protective factors against depressive symptoms (see Figure 10, p. 72). Adolescents with parents who have a high school education report higher levels of intergenerational network closure, which serves as a protective factor against depressive symptoms. However, unexpectedly, adolescents with parents who have a high school education report less parental support, which becomes a risk factor for depressive symptoms. A possible explanation is that increased education could be associated with increased time in the labor market and less availability for children. This finding merits further investigation.

This study contains a number of limitations deserving discussion. Cross sectional data were analyzed, limiting inferences of causality. Results should be interpreted as *plausible* mechanisms identified through significant mediation effects. To ensure the strongest study design, a theoretically based conceptual model (see Figure 1, p. 16) was tested using two waves of data and suggested mediation effects were tested for significance. Temporal order was controlled through the use of independent variables from Wave I data of the National Longitudinal Study of Adolescent Health and the use of a validated measure of depressive symptoms by race/ethnicity and generational status from Wave II data (Perreira et al., 2005). Another limitation is the use of self reported data. However, adolescents were provided with computer-assisted technology when answering sensitive questions. For the mediators, there was a lack of prior reliability analysis for the stress scale. This scale was based on previous research undertaken with an adult immigrant population. The measure of assimilation used in this study is also of concern. It is a nominal level variable with three categories that reflect generational status. An ideal measure would include a scale that captures beliefs, preferences,

behaviors, and activities for both the host and home culture (Birman & Taylor-Ritzler, 2007). Other proxy assimilation measures could include number of years in the United States and age of migration. This study could also move beyond the psychological pathway of depressive symptoms to expected outcomes of depression, extending both the conceptual model of this study and the Berkman et al. (2000) conceptual model of how social networks impact health. It is important study findings not be generalized to non-school based adolescent populations.

Avenues for future research include investigation of additional mediators in the conceptual model, such as social network characteristics and additional types of social supports. A lack of available measures of social networks and financial and informational supports in the Add Health public dataset prevented this exploration. The further investigation of intergenerational network closure through quantitative and qualitative methods is merited. It is a largely unexplored type of support that could have additional benefits for adolescents, and in particular adolescent immigrants. The relationships between the various types of support, beyond associations to directionality, merit investigation, as do potential interaction effects of background variables and mediators. For example, the relationship between intergenerational network closure and parental support could be investigated. Ying and Han (2008) conceptualized parental social involvement as knowing the names of child's close friends and friends' parents, which begins to suggest intergenerational network closure. They found parental social involvement is negatively associated with family conflict ($b_{\text{standardized}} = -.21, p \leq .05$). Another example is to explore the interaction of race and gender on stress and supports. Path analysis and structural equation modeling could more effectively explore these

multiple relationships. Studies allowing for longitudinal analysis should also be sought, as this will allow for inferences of causality. Another direction worthy of exploration in the United States sample is considering a different definition for the second generation. This study included adolescents with either parent born in a foreign country, as this is a widely held definition in the United States. However, adolescents with one U.S. born and one foreign born parent, versus those with two foreign born parents, are arguably more assimilated. Considering them in the same group may confound data (Oppedal & Røysamb, 2004; Stefanek et al., 2012; Xu et al., 2010). Worth mention is the importance that all suggested future research keeps the broader context of racial and ethnic health disparities as a framework for understanding health disparities between immigrant adolescents and native peers. In addition a gender and socioeconomic perspective should be maintained.

Study results provide necessary evidence for practice and policy aimed at reducing depressive symptoms in adolescence and highlight risk factors adolescent immigrants are more likely to possess. The advantage of these findings is that they may be generalized to the American adolescent population as they rely on nationally representative data. Practice implications include the use of findings to create and tailor empowerment and community youth development interventions to allow social workers, public health workers, and youth workers to leverage social networks as a mechanism for reducing depressive symptoms in both immigrant and native adolescents (Dominguez & Arford, 2010). Empowerment interventions could center on taking an inventory of youth stress and social supports, educating youth on how stress and social supports are linked to depressive symptoms, assessing with youth which relationships in their networks are

contributing to positive sources of support, and assisting youth to create more resources by either changing existing relationships or building new relationships. Community youth development interventions could call on social service and youth agencies to develop and tailor youth programs that promote resource rich social networks for youth. An after school program located at the youth's school could serve to decrease levels of school related stress, increase opportunities to make new peers, and increase opportunities for intergenerational support through multi-generation events (Dominguez & Arford, 2010). Policy implications are that policy must center on the critical need to address barriers of racism, sexism, and poverty in the United States. Included in the long list of negative consequences of such inequality lie negative psychological outcomes for youth. While working on micro and mezzo-level interventions this macro perspective must not be diminished, as it will continue to underlie and influence individual psychological outcomes. Understanding a variety of protective and risk factors and plausible mechanisms of depressive symptoms in adolescence will enhance work intended to increase the psychological wellbeing of both native and immigrant adolescents.

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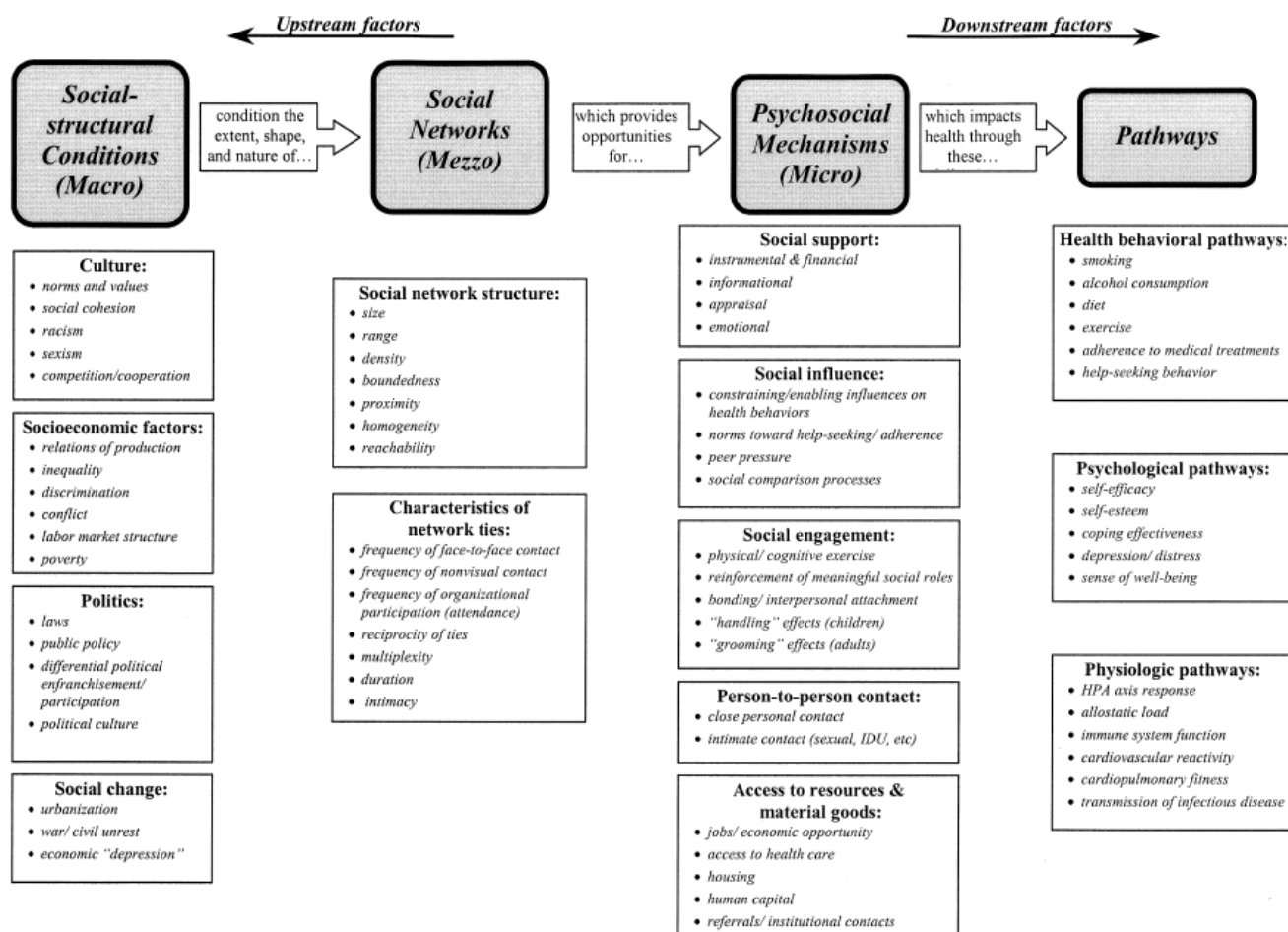
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Appendix

Figure A1: Conceptual Model of How Social Networks Impact Health



Source: Berkman, L.F., Glass, T., Brissette, I. & Seeman, T.E. (2000)

Table A1

Comparison of Design and Analytic Samples^a - Mean or %

	Design Sample (N=4,834)	Analytic Sample (N=4,263)
Depressive symptoms	2.41	2.37
Age	15.54	15.53
Sex		
Male	50.7%	50.54%
Female	49.3%	49.46%
Household income ^b	46.31	47.31
Parent education		
Less than high school	15.64%	15.35%
High school	84.36%	84.65%
English at home		
No	7.03%	7.70%
Yes	92.97%	92.30%
Race		
Hispanic	13.04%	13.21%
Black	16.16%	14.74%
Asian	3.32%	3.55%
White	67.48%	68.50%
Self esteem	8.53	8.54
Stress	4.19	4.15
Parental support	30.72	30.94
School support	14.80	14.86
Peer support		
Not at all	.70%	.73%
Very little	2.15%	2.09%
Somewhat	12.44%	12.37%
Quite a bit	42.71%	42.97%
Very much	42.0%	41.84%
Intergenerational network closure (no. parents talked to in last 4 weeks)		
0	22.94%	22.73%
1	20.22%	19.89%
2	20.25%	20.02%
3	13.28%	13.51%
4	8.73%	8.61%
5	3.52%	3.74%
6 or more	11.05%	11.50%

^aWeighted, non-imputed data^bHousehold income is reported in thousands

Table A2

Depressive Symptoms Scale (N=4,263)

Variable	Cases	%
Had the blues		
Never/rarely	3,022	70.89
Sometimes	895	20.99
A lot of the time	256	6.01
Most/all of the time	83	1.95
Missing	7	.16
Felt depressed		
Never/rarely	2,657	62.33
Sometimes	1,234	28.95
A lot of the time	261	6.12
Most/all of the time	108	2.53
Missing	3	.07
Happy		
Never/rarely	1,612	37.81
Sometimes	1,778	41.71
A lot of the time	775	18.18
Most/all of the time	95	2.23
Missing	3	.07
Felt sad		
Never/rarely	2,278	53.44
Sometimes	1,709	40.09
A lot of the time	214	5.02
Most/all of the time	58	1.36
Missing	4	.09
Life not worth living		
Never/rarely	3,853	90.38
Sometimes	319	7.48
A lot of the time	57	1.34
Most/all of the time	28	.66
Missing	6	.14

Table A3

Reliability Analysis (Cronbach α)^a

	Gen 1 (n=213)	Gen 2 (n=510)	Gen 3 (n=3,540)	Analytic Sample (N=4,263)
Depressive symptoms (5 items)	.74	.79	.78	.79
Stress (4 items)	.76	.68	.69	.69
Parental support (8 items)	.88	.87	.88	.88
School support (4 items)	.72	.74	.77	.77
Self esteem (2 items)	.67	.77	.77	.76

^aBased on standardized items, listwise deletion, and unweighted, non imputed data

Table A4

Skew and Kurtosis of Variables Used in Regression Analysis (N=4,263)^a

Variable	Skew Untransformed	Kurtosis Untransformed	Skew Transformed	Kurtosis Transformed
Depressive symptoms ^b	1.52	5.71	.04	2.40
	.06	2.24	NA	NA
Household income ^c	8.01	103.29	-.84	5.79
Self esteem ^b	-1.00	5.96	-.22	2.69
Stress ^b	.94	3.99	-.45	3.24
Parental support	-.42	2.38	NA	NA
School support ^b	-1.45	6.26	-.38	3.55
Peer support ^b	-.98	4.08	-.52	2.59
Intergenerational network closure	-.62	2.34	NA	NA

^aUnweighted, non imputed data; used +/- .80 cut off for acceptable skew; table doesn't include data on nominal level variables

^bSquare root transformation

^cLog transformation